1. A Study of Experiences of Beneficiaries, Enrollees and Stakeholders of Tamil Nadu Chief Minister’s Comprehensive Health Insurance Scheme (CMCHISTN) : A Qualitative Study ......................... 01
   P Shirisha

2. Effectiveness of Self Myofascial Release, Static Stretching and Neural Tissue Mobilization on Hamstring Flexibility in Athletes ................................................................. 06
   Gatha Patel, Khushboo Bathia, Smita Kanase, Amrutkuvar Pawar, Vishnupriya Deshpande, Prachi Jain

3. Effect of Ground Level Reverse Treadmill Walking Versus Incline Reverse Treadmill Walking as an Adjunct to Conventional Physiotherapy in Chronic Knee Osteoarthritis Subjects ............................ 12
   Amruta Khilwani, Amrutkuvar Pawar, Trupti Warude, Khushboo Bathia

4. Influence of Dietary Solvents on the Strength of Nanofill, Microfill and Minifill Composites ........ 19
   Ayush Razdan Singh, Raazia Khan, B Rajkumar, K K Dixit, Gayathri S Jethwani, Alok Mishra

5. A Study of Factors affecting Online Shopping in Chennai ............................................................. 24
   V. Andal, G. Mythili

6. Perceived Benefits & Risks of Online Grocery Shopping: Role of Cognitive Influences ............... 29
   Sneha Ghati, Somya Tripathi

7. Effect of Barefoot Functional Rehabilitation in Flat Foot among Obese Women .......................... 36
   Hemali Patel, S Anandh

8. Effect of Core Stability Exercise Programme Using Swiss Ball, Theraband and Floor Exercises on Abdominal Girth and Core Strength in Post Menopausal Women ......................................................... 41
   Vishakha Panchal, Amrutkuvar Pawar, Trupti Warude, Khushboo Bathia

9. A Community based Cross Sectional Study to Assess the Association between Indices of Obesity and Hypertension ................................................................. 48
   Arun Varghese, Prakash M Durgawale, Satish V Kakade, Dhirajkumar A Mane, Supriya S Patil

10. Attitude Towards Ageing among Older Population ................................................................. 54
    B Jayabharathi, Nisha Yadav, Tharageshwari, Buvana

11. Impact of Farm Technology on Rice Production in Madurai District, Tamilnadu ......................... 60
    S Thangamayan, B Chithirairajan, S Sudha

12. A System Dynamics Approach to Understand Respiratory Health Risk in Rural Population ........ 65
    Snehlata Tigala, Anu Rani Sharma, Kamna Sachdeva
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Effectiveness of Lifestyle Modification for Grade I Hypertensive Individuals</td>
<td>Akshaya Ashok Lade, Poovishnu Devi Thangavelu, Vaishali Krishnat Jagtap</td>
</tr>
<tr>
<td>14</td>
<td>Growth Performance of Leather Industry in India</td>
<td>S Thangamayan, R Bharathi Rajan, B Chithirairajan</td>
</tr>
<tr>
<td>15</td>
<td>Effectiveness of Cabbage Leaves Application on Breast Engorgement: Narrative Review</td>
<td>Akanksha Yadav, Kavitha Mole PJ, Nageshwar V</td>
</tr>
<tr>
<td>16</td>
<td>Reliability Estimation and Pilot Testing of Diet Quality Assessment Tool for Indian Children</td>
<td>Ritushri Chamoli, Vandana, Monika Jain</td>
</tr>
<tr>
<td>17</td>
<td>Effect of Task Related Exercise on Arm and Hand Function among Patients with Stroke</td>
<td>Deepthi John, Kanmani J</td>
</tr>
<tr>
<td>18</td>
<td>Self-disclosure and Quality of Relationship amongst Spouses of Combatants at a Forward Fighter Airbase</td>
<td>MPS Marwaha, M V Singh, Rajesh Vaidya, Bhupinder Kaur Anand, Alok Kumar Chowdhury, Rajat Kumar Garg</td>
</tr>
<tr>
<td>19</td>
<td>Experience of Prioritizing in Nursing Care in India: A Qualitative Study</td>
<td>Lata Mandal, A Seethalakshmi</td>
</tr>
<tr>
<td>20</td>
<td>Efficacy of Botulinum Toxin Type A in the Treatment of Post Surgical Parotid Fistula -A Systematic Review</td>
<td>Kunal Gajendragadkar, Kalyani Bhave, Surabhi Magoo, Santhoshkumar S.N, Bhagyashree Jagtap, Kshitija Sonawane</td>
</tr>
<tr>
<td>21</td>
<td>Analysis of Factors Influencing Medical Tourism in India Chennai and its Impacts</td>
<td>J. Revathi, S. Jansi Rani</td>
</tr>
<tr>
<td>22</td>
<td>Radicular Cyst Associated with a Primary Molar: A Case Report</td>
<td>Rose Maria Joseph, Karuna Y M, Dharnappa Poojary, Ashwin P Rao, Anupama Nayak P</td>
</tr>
<tr>
<td>23</td>
<td>Functional Outcome of Multiple Plate Fixation of Tibial Plateau Fractures based on New “Three-Column Concept” Fracture Classification</td>
<td>Mahipat Singh, Deepinder Chaudhary, Manrattan Bhathal, Neha Baiswar, Divyant Randhawa, Jayant Randhawa, Vivek Kumar Madhur</td>
</tr>
<tr>
<td>24</td>
<td>Assessment of the Oral Health Status and Erosive Tooth Wear among Employees of a Petrochemical Industry in Mangalore, India</td>
<td>Vaibhav Pravin Thakkar, Ashwini Rao, Rajesh G, Ramya Shenoy, Mithun Pai B.H</td>
</tr>
</tbody>
</table>
27. Relationship between Geriatric Oral Health Assessment Index (GOHAI) and Oral Health Status of the Institutionalized Elderly in Mangalore, India .......................................................... 146
   Priyanka Ravi, Ashwini Rao, Gururaghavendran Rajesh, Ramya Shenoy, BH Mithun Pai

28. Comparative Study of CMC 0.5% Eye Drops versus Combination of 0.05% Cyclosporin Ophthalmic Emulsion and 0.5% CMC Eye Drops in Dry Eye Disorders .................................................. 152
   Prerana Agarwal, D.J. Pandey

   M Kiran Kumar, Divya Udayan J

30. Attitudinal Parameters Influencing Treatment Seeking Behavior during Child Diarrhea in India .... 163
   Surya AV, Sanjeev MA, Rahul Sharma

   Chatterjee Soham, Shetty J. Neetha, M.V Ashith

32. Role of Low Molecular Weight Heparin in Thromboprophylaxis for Hip and Knee Arthroplasty ..... 174
   Deepinder Chaudhary, Mahipat Singh Manrattan Bhathal, Neha Baiswar, Jayant Randhawa, Divyant Randhawa

33. Impact of Attention Deficit Disorder on Academic Performance of Children ............................... 179
   Santosh B.R, Rachana N

34. Dental Educational Environment in Institutions of South East Asia ............................................. 185
   Ramprasad Vasthare, Swagata Saha

35. Understanding Relationship between Internet Addiction and Emotional Intelligence with Reference to Delhi-NCR Region ................................................................. 191
   Verma Priti, Arora Nidhi

36. A Study on Occupational Stress of Assistant Professors in Selected Private Universities – Chennai .......................................................... 197
   P. Abinaya, S Indupriya

   Somil Jain, Manmohan Sharma, Puneet kumar

38. Effect of Core Training with and without Yogic Practices on Selected Psychological Variables among College Women Athletes ................................................................. 208
   R. Meera, R. Mohanakrishnan, T. Arun Prasanna

   Bhupinder Kaur Anand, MPS Marwaha, Sudhanshu Agrawal, Dipti Singh, Sapna Jaiswal, Salil Kumar Srivastava

40. Influence of Organizational Justice on Teachers’ Job Attitude – A Review ................................. 218
    S Suganya

41. Prevalence of Panton Valentine Leukocidin (PVL) gene of Staphylococcus aureus Isolated from Different Sepsis Cases in Odisha, India ................................................................. 223
    Anima Mohanty, Bibhuti Bhusan Pal
42. Does Serum Cotinine affects Lipid Profile? ................................................................. 229
   Vaishali S. Pawar, Ajit Sontakke, Satish Kakade, Jaywant Thorat

43. Betatrophin: It’s Impact on Lipid Profile in Type two Iraqi Obese Diabetic Women .......... 236
   Raghd A.Y. Alkhader, Khitam abdul-wahhab Ali, Abbas Mahdi Rahmah Al-Kharasani

44. Interaction Between Tobacco Consumption, BMI and Diabetes ...................................... 242
   T Manigandan, S Kisore Kumar, A Julius

45. Effective Usage of Exhaled Volatile Organic Compounds in Disease Diagnosis: A Comprehensive Review ................................................................. 246
   G.S. Karthick, P.B. Pankajavalli

46. Patients Health Monitoring System Using IOT ............................................................. 252
   Sudha Senthilkumar, Brindha.K, Charanya R, Abishek Kumar

47. Nanosensors in Blood Glucose Measurement: A Review ............................................... 257
   G.Kavitha, K.Senthil Kumar

   Binil V, Christopher Sudhaker, Supriya Hegde, Unnikrishnan B, Alphonsa Ancheril

49. Caries Prevention by Biofilm Control: Newer Frontiers in Management ........................... 267
   Sowmya Sridhar, Baranya Shrikrishna Suprabha, Arathi Rao

   Jasmine Mary Antony, Aravind R. Kudva, Harish K Shetty, Shravan Kini, Sree Gowri

51. Digital India, Digitizing the Orthodontic Office- Our Experience with Design and Implementation of a Contemporary Patient Management System ............................................. 278
   Nidhin Philip Jose, Siddarth Shetty, Dilip G Naik, Shravan Shetty, Asavari Desai, Ashith MV, Lida Mary

52. Multi-State Models for the Time to Event Post-Transplantation Cancer Data: A Competing Risks Approach ................................................................. 283
   Chinnaiyan Ponnuraja, Valarmathi Srinivasan, Pari Dayal. L, B.Krishna Prasanth, K.M.K.Masthan

53. Family Support and Medication Nonadherence among Elderly on Antihypertensives ........ 294
   Melita Sheilini, H Manjunatha Hande, Anice George

54. Young People with Physical Disability Talking about Depression ................................... 299
   Manoj Mathew P, Suja M K

55. Bio-Medical Waste Management at an Academic Hospital: Knowledge and Practice of Hospital Staff ................................................................. 304
   Khajan Singh, Niti Solanki Gahlot, Amrit Virk, Mahima Panigrahi, Narottam Samdarshi

56. Stakeholder Perception of Health Technology Assessment in Industrial Setting ................ 309
   Sowmya Sundararajan, Sanjay Pattanshetty, Kiran R Aatre, Manisha Gore, Ravi Raj Singh Chouhan
<table>
<thead>
<tr>
<th>Page</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>57.</td>
<td>Analysis of Uterus Involution, Lochea Expenditures and Back Pains on the Post Partum Mother Using Bengkung and Gurita</td>
<td>Sandu Siyoto</td>
</tr>
<tr>
<td>58.</td>
<td>An Economic Analysis of Jasmine Cultivation in Madurai District, Tamilnadu</td>
<td>S Thangamayan, S N Sugumar, S Chandrachud</td>
</tr>
<tr>
<td>59.</td>
<td>Effect of Mulligan’s Pain Release Phenomenon with Kinesiotaping in Chronic Patellofemoral Osteoarthritis</td>
<td>Nikhil Bhosale, Smita B Kanase, Khushboo Bathia</td>
</tr>
<tr>
<td>60.</td>
<td>Childhood Immunization Coverage and Factors Associated with it among Urban Slum Population in a South Indian City</td>
<td>Akshay Salgar, Satyajit Pattnaik, Samina Ausvi, Dhananjaya Sharma</td>
</tr>
<tr>
<td>61.</td>
<td>Customer Satisfaction on Health Insurance in India – A Study</td>
<td>A. Meenakshi, S. Vennilaa Shree</td>
</tr>
<tr>
<td>64.</td>
<td>Measure to Human Ailments – A Holistic Approach</td>
<td>S N Sugumar, M P Agathiyar, S Chandrachud</td>
</tr>
<tr>
<td>65.</td>
<td>Enhancing the Role of Public Health Center as Gatekeeper on the National Health Insurance</td>
<td>Betri Anita, Henni Febriawati, Desri Suryani, Yandrizal, Bintang Agustina, Pratiwi, Wulan Angraini, Riska Yanuarti</td>
</tr>
<tr>
<td>66.</td>
<td>Involvement of KRAS rs61764370 T&gt;G Gene Variation in Leukemia Patients of Saudi Arabia</td>
<td>Osama Al-Amer, KF Alsharif, Rashid Mir’ FM Abu-Duhier, Abdulraheem Almalki, Wayil Yassen</td>
</tr>
<tr>
<td>67.</td>
<td>Prevalence and Risk Factors of Hypertension Stage 1 in Banjar Ethnic, South Kalimantan, Indonesia: Finding from the Indonesia Family Life Survey (IFLS) 5</td>
<td>Ahmad Taufik Azis, Syahrizal Syarif</td>
</tr>
<tr>
<td>68.</td>
<td>Evaluation of Some Biochemical Markers in Patients Serum of Myocardial Infarction and Heart Failure</td>
<td>Ahmed Salih Lateef, Saddam Jumaa Nasser, Ayad Abdulrazzaq Mutar</td>
</tr>
<tr>
<td>69.</td>
<td>Comparative Study between Ultrasound Finding and Retrograde Urethrography to Evaluate Urethral Stricture</td>
<td>Ahmed Turki Obaid</td>
</tr>
<tr>
<td>70.</td>
<td>The Experience of Married Men Who Have Sex with Female Sex Workers (FSW)</td>
<td>Ainun Sajidah, Evy Marlinda, Agus Rachmadi</td>
</tr>
</tbody>
</table>
71. Seroprevalence of HBV, HCV, and HIV among Blood Donors in Main Blood Bank in Najaf Province, Iraq ........................................................................................................................................................ 385
   Rana Talib Al-Nafakh, Shaymaa Abdul Ittef Al-Fadhul, Hashim Ali Abdulameer Al-Sherees, Alaa H. Al-Charrakh

72. System Analysis of Public Health Surveillance in School-Age Children ............................................ 391
   Arief Hargono, Kurnia Dwi Artanti, Fariani Syahrul

73. Dental Health Behavior in Elderly based on Demographic Characteristics ............................................. 397
   Aulia Feresia Mauline, Taufan Bramantoro, Retno Palupi

74. Cryoglobulin Responses and Herd Immunity Plots among Periodontitis Patients .............................. 402
   Baha, Hamdi Hakim Al-Amiedi, IMS Shnawa, Zainb, M. Hameed

75. Effect of Obesity in the Mode of Delivery ........................................................................................... 406
   Ban Amer Mousa

76. Post-Traumatic Stress Disorder among Women with Breast Cancer in Iraq: A Preliminary Report ... 411
   Aqeel S. Mahmood, Mushtaq T. Hashim, Eman A. Al-Kaseer

77. Molecular Diagnosis and Phylogenetic Analysis of 5.8s rDNA Gene of Cutaneous Leishmaniasis Species in Holy Karbala/Iraq ................................................................................................................ 414
   Dhamiaa Maki Hamza, Laith Hasan Obayes, Fadhil Sami Zghair

78. Association of Certain HLA-II/DR Alleles with Incidence of Thyroiditis in Iraqi Patients .............. 420
   Samir S. Raheem; Mussa M. Alkhatib, Mohammed M. Alomari

79. Factors Associated with Self-Empowerment among Patients with Diabetes Mellitus in South Kalimantan ........................................................................................................................................... 423
   Endang Sri Purwati Ningsih, Syamsul Firdaus

80. Irisin, Resistin and 25-Hydroxyvitamin D in Iraqi Obese and Non-Obese Type 2 Diabetic Patients .. 428
   Gumar O Zamil, Halla G Mahmmod, Basil O Saleh

81. Diagnostic Value of Clinical Assessment in Comparison to Ultrasound in Meniscal Injury .......... 433
   Mahmoud Khudair Yaseen, Faq I. Gorial

82. Legal Protection of Midwives Based on Professional Justice in Midwifery Practices ........................ 437
   Fitriani Nur Damayanti, Absori Absori, Kelik Wardiono

83. Study of Biochemical Criteria of Blood for Thalassemia Patients ....................................................... 442
   Hanan Jassim Hammod, Zainab Kareem Al-Kazazz, Hassan A Farman

84. Performance Analysis of Indonesian Public Hospitals: A Panel Data Method .................................... 447
   Jon Hendri Nurdan, Sjafrizal, Hefrizal Handra, Hardisman Dasman

85. Evaluation of Platelet Rich Fibrin Effect in the Bone Density after Teeth Extraction by Cone Beam Computed Tomography .............................................................................................................. 453
   Kamal Saheb Mezal, Sahar Shakir Al-Adili, Ali S. Al-Haddad

   Hashim Fawzi Dabbas, Safa Tayeh Muhemmed
87. Incidence of Rota Virus as a Causative Pathogen in Iraqi Children Infected by Diarrhea .......... 463
Samir S. Raheem, Mohammed M.M. Alomari, Nawar J.H. Al-Salih

88. Bladder Injury as a Complication of Cesarean Deliveries And Peripartum Hysterectomy .......... 467
Nagham K. Tayeh, Nada Kadhum Kareem, Hayder Adnan Fawzi

89. The Spatial Perception as an Connotation to the Performance Level of the Forward Repel Blow of the Badminton ........................................................................................................... 472
Hisham Hindawi Howaidi, Asaad Ali Safih, Alaa Abdul Sada Mohammed

90. Echocardiographic Stigmata in the First Attack of Acute Rheumatic Fever as a Major Criterion for the Diagnosis of Rheumatic Carditis in Misan, Iraq .............................................................. 478
Khalid Obaid Mohsin, Hussein Fadhil Musa Aljawadi, Esraa Abd Al-Muhsen Ali

91. A Comparative Study of Different Types of Warm-up Effect on Postural Stability and Isokinetic Strength ................................................................................................................................................ 483
Mohammad Ahsan

92. Evaluation of the Effects of Insulin Therapy on peripheral Nervous System in Diabetic Patients ...... 490
Mufeed Akram Taha

93. Differences in Self-Efficacy Before and After Antenatal Education ........................................ 496
Nur Jaqin, Muh. Syafar, Arsunan A.A, Prihantono, Suryani A

94. Body Mass Index During Child Development and It’s Association with their Immunity ............. 502
Qasim Dawood Yasir Altameemi, Mohanad Kadhim Mohammed Ali

95. Regional Longitudinal Strain by Speckle Tracking Echocardiography in Coronary Artery Disease .. 507
Saeed H. Lafta, Mohammad Saeed A., Khalid E. Amber

96. Global Longitudinal Strain Accurateness in Prediction of Ischemic Heart Disease .................... 513
Saeed H. Lafta, Mohammad Saeed A, Khalid E Amber
Sarah Mazin Naeem, Hussein A. Abdulkadhim, Kifah J. Shaker, Hamid N. Obied

97. Assessment of the Antineoplastic Effects of the Investigational Agent PAX2M as C-MYC Onco-Protein Blocking Agent in Human Colorectal Cancer Cells Model Sw480 Cell Line ......................................................... 519
Sarah Mazin Naeem, Hussein A. Abdulkadhim, Kifah J. Shaker, Hamid N. Obied

98. The Main Challenges Facing the Iraq Banks ............................................................................... 525
Shaymaa Dhafer Hashem

99. Factors Affecting the Implementation of Clean and Healthy Living Behavior at Household Level (Observational Study at Sungai Paring Village, Martapura Kota District) ............................................. 529
Laily Khairiyati, Fauzie Rahman, Arnila Udin, Vina Yulia Anhar

100. Point Prevalence of Healthcare Associated Infection and its Risk Factors among Patients Admitted to the Intensive Care Unit in Baghdad Medical City ......................................................... 535
Waleed Ibraheem Ali, Hayder Adnan Fawzi, Huda Jassim Lafta, Sarah Alaa Mohammed, Noor Mosaad Ameer

101. Histopathological Study of Well Differentiated Papillary Thyroid Carcinoma Case Study ............ 541
Abdul Hadi Sallal Mohammed, Rasha Abdul Ameer Jawad, Ali Khudheyer Obayes
102. Family Support of Ifontoks to their Pregnant Teenagers: an Extension Health Service Program of Mountain Province State Polytechnic College ..................................................................................... 545
   June II A.Kiblasan

103. The Description of Musculoskeletal Symptoms, Workstation Design Compliance, and Work Posture among Computer Users at Head Office Jakarta Year 2018 .......................................................... 551
   Sjahrl Meizar Nasri, Dita Maharani Kusumaningrum

104. Samban as a Complementary Immunization in Dayak Pitap Tribe in Indonesia (A Preliminary Study) ........................................................................................................................... 556
   Ida Hastutiningsih, Oedojo Soedirham

105. Factors Influencing the Participation of National Health Insurance Independently .................. 561
   Ary Nugraha, Nida Ulfah, Mohammad Isa, Bahrul Ilmi

106. Prevalence and Perception of Women about Consanguineous Marriage in Al-Ramadi City .......... 567
   Badeea Thamer Yahyaa, Mustafa Ali Mustafa Al-samarrai, Saad Ahmed Ali Jadoo

107. Study of Counseling on Knowledge, Attitude and Behavior of Drug Supervisor (PMO) of Tuberkolosis Patient ........................................................................................................................................ 574
   Ade Irwansyah, H Adenan, M Kes, dan Lenie Marlinae, SKM, MKL
108. Assessment of Nurse’s Awareness about Autism Spectrum Disorder in Pediatric Wards at Kirkuk Public Hospitals
Idrees Hasan Mohammed, Bahar Nasradeen Majeed

109. Assessment of Nurses’ Knowledge and Practices Regarding Nasogastric Tube at Neonatal Intensive Care Unit in Baghdad Hospitals
Asmahan Qasim Mohammed

110. Effect of Hypoxic Training in Some of the Physiological Capacity of Junior Players: Coefficient of Stability and Objectivity for Tests of Aerobic and Anaerobic Efficiency
Mohamad Musa Mohamad, Ali Hashim Hamza

111. Effectiveness of an Education Program on Nurses knowledge concerning in Nursing Management for patients with Heart Block in Kirkuk Teaching Hospitals
Abid Salih Kumait AL-Jumaily, Khalidah Mohammed Khudur

112. Effectiveness of Education Program upon Patient’s Knowledge toward Hemophilia among more than Fourteen Years Old in Thi-Qar Heredity Center
Ali Abdulretha, Salma Khadom Jehad, Kahtan Hadi Hussen

113. Evaluation of Lipid Profile and Thyroid Function in Hyper and Hypotensive Patients: a Case Control Study
Falah S. Al-Fartusie, Nabaa Nabil, Dheaa Sh. Zgeer

114. Hemodialysis Nurses’ Practices toward Hand Hygiene Performance at Baghdad Teaching Hospitals
Serwan J. Bakey

115. Intrauterine Growth Restriction is Frequent Obstetric Problem in Mid-Euphrates Region of Iraq: a Case Control Study
Suad Abdulzahra Mutar

116. Investigating of Geriatric Depression among Elderly in Nasiriyah City
Hussein Jassim, Alaa M Tuama, Hassan Alwan

117. MicroRNA196a2 rs11614913 Genotypic in Iraqi Newborn Babies with Neural Tube Defects
Alaa Hadi Skakir, Rabab Omran

118. Nutritional Status of Older Adults in Al-Nasiriyah City
Hussein Jassim, Alaa M Tuama, Hassan Alwan
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>119</td>
<td>Pregnant Women’s Knowledge Concerning Tetanus Vaccination in Al-Rusafa Health Sector</td>
<td>Rusul S. Ghazal, Eman A. Jaber</td>
</tr>
<tr>
<td>120</td>
<td>Prevalence of Septicemia among Under Five Years Children during the Last 5 Years Ago in Hilla City</td>
<td>Rusul Hamza Kh. AL-Jubori, Nada Khazal Kadhim Hindi, Ali Saad Shaker, Sadiq Dawood Jadah, Zohoor Adnan Karim, Zahra Ahmed Gleidan, Mohammed Malih Radhi</td>
</tr>
<tr>
<td>121</td>
<td>Prognostic Role of ki-67 Immunohistochemistry in Soft Tissue Sarcoma: Review and Meta-Analysis</td>
<td>Aws Rassul Hussein Al-salih, Raad Jawad Kadhim Al-Shaibany</td>
</tr>
<tr>
<td>122</td>
<td>Seroimmunological Study for Detection of Hepatitis B Surface Antigen among Healthy Blood Donors in Diwaniyah –Iraq</td>
<td>Abdulameer K. Leelo, Saeed hilal khudhair, Radhia Hussain Fadel</td>
</tr>
<tr>
<td>123</td>
<td>The Effect of the Felder and Silverman Model on the achievement of Students in the Fourth Grade in Chemistry</td>
<td>Ahmed Abdul Hussein Nema, Saeed Hussein Ali Al Thalab, Fadel Amran Issa</td>
</tr>
<tr>
<td>124</td>
<td>The Impact of Teaching the Reading by Skamper’s Strategy to Develop the Habits of Mind for Students of the Fourth Grade Literary</td>
<td>Salem Nadhim Nasser, Khaled Rahi Hadi, Zeina Ghani Abdul Hussein</td>
</tr>
<tr>
<td>125</td>
<td>The Impact of the Information Gap Strategy Academic Achievement of first grade students of Intermediate school In (Sciences)</td>
<td>Ali Radha Mujid, Saeed Hussein Ali Al-Thalab, Abdul Amir Khalf Arat</td>
</tr>
<tr>
<td>126</td>
<td>FTO rs17817449 Gene Polymorphism as a Predictor for Maternal Obesity in Iraqi Pregnant Women</td>
<td>Shahla O. Al-Ogaidi, Sura A. Abdulsattar, Hameed M. J. Al-Dulaimi</td>
</tr>
<tr>
<td>127</td>
<td>Structural and DFT/TD-DFT Investigation of New Rhenium Metal Complexes To Elicit the Special Effects of Insulin</td>
<td>Hussein Neama Najeef, Mohammed Abdul Ammer AL-Shareefi, Hamid I. Abbood</td>
</tr>
<tr>
<td>128</td>
<td>Effectiveness of Structured Teaching Program upon Midwives’ Knowledge Concerning Use of Partograph during First Stage of Labor in Al-Hilla Hospitals</td>
<td>Fawziya M. Nattah, Amean A. AL-Yasir, Muna A. Khaleel</td>
</tr>
<tr>
<td>129</td>
<td>The Effect of the Pyramid Strategy of Preference on the Achievement of Students in Science in the Development of Human Life in the Field of Health and Energy</td>
<td>Alaa Mohammed Tuhah, Saeed Hussein Ali Al Thalab, Mohammed Hadi Shnein</td>
</tr>
<tr>
<td>130</td>
<td>The Impact of Reading Comprehension Skills to Develop the Habits of Mind for Students</td>
<td>Khalid Sabah Dawood, Mashrq Muhammad Mjual, Rasim Ahmed Abees</td>
</tr>
<tr>
<td>131</td>
<td>The Impact of Yowadi’s Strategy on the Acquisition of Rhetorical Concepts to Develop the Habits of Mind for Students is the most honorable science</td>
<td>Fatima Nouri Bahaa Al-Moussawi, Zeina Ghani Abdul-Hussein Al-Khafaji, Jalal Aziz Farman Al-Barqawi</td>
</tr>
<tr>
<td>132</td>
<td>Thyroid Status in Iraqi Subfertile Women: a Case Control Study</td>
<td>Hyfaa Abdulhasan Raffas, Hussein Abdulzahra Al-janabi, Raheem Ghabdhab Jawad</td>
</tr>
</tbody>
</table>
133. Prevalence of Back Pain and its Socio-Demographic, Postural and Behavioral Associated Factors among Primary Schoolchildren in Baghdad City ................................................................. 716
   Nawar Sahib Khalil, Mazin Ghazi Jasim Alrubaey

134. The Relationship between Dental Caries in Primary Teeth and Permanent First Molars in Schoolchildren Aged 8-9 Years in Wasit Governorate- Iraq ......................................................... 724
   Hanan F. Abbas

135. Molecular Diagnosis of some Virulence Genes in Pseudomonas aeruginosa Clinical Isolates in Wasit Province ........................................................................................................ 728
   Rawan Hassan Abdulaali Al-Saeedi, Rana Hussein Raheema

136. Persistently Elevated Levels of Serum Autoimmune Inflammatory Markers after Total Thyroidectomy for Hashimoto’s Thyroiditis An Indicator of Prevailing Autoimmunity .......................................... 736
   Adil Shaker Al-Tamimi, Israa A Dheeb

137. Depression among Islamic School (Madrasah) Students in Marang and Setiu District, Terengganu ......................................................................................................................... 742
   Ain Syahada H., Siti Hajar A. R

138. Perspective of Malaysian Youths towards Homosexuals ......................................................... 747
   Mohd Syaiful Nizam Abu Hassan, Ahmad Zafran Azhar, Nasriah Kamaruddin, Amanina Mohamad

139. Factors Associated With Post-stroke Nutritional Status in Stroke Survivors under Rehabilitation ... 752
   Chin Yi Ying, Sakinah Harith, Aryati Ahmad, Hassan Basri Mukhali

140. Effect of Phytochemicals in Phoenix Dactylifera L. on Human Body Using LC-QTOF-MS ........ 759
   Sabri Nurul Elma, Dzulfadli Rosli, Khalilah Badarusham, Shamala Salvamani, Mohd Sukri Hassan

141. Phytochemistry and Antibacterial Activity of Cynometra Caulifora ................................................. 765
   Noor Zarina Abd Wahab, Norhidayah Badya, Nazlina Ibrahim, Mohd Khairul Amri Kamarudin

142. Spatial Model of Non-Ionizing Radiation Exposure around Gong Badak ..................................... 770
   Nurul Syafiqah Hasshim, Roslan Umar, Nor Hazmin Sabri, Khairul Anwar Rosley, Hajar Jaafar, Roha Tukimin, Shamesh Raj A/L Parthasarathy

143. Mental Health Mediate Social Support to Predict Quality of Life among Drug-Abuse Inmates ...... 776
   Fazida Karim, Mahadzirah Mohamad, Norhilmi Muhammad

144. Freshwater Governance on Limboto Lake in Gorontalo Province of Indonesia .................... 782
   Achmad Rizal, Subiyanto, Hafizan Juahir, Fathurrahman Lananan

145. Non-Ionizing Radiation Measurement around Four Different Selected Areas .......................... 788
   Khairul Anwar Rosley, Nor Hazmin Sabri, Roslan Umar, Nurul Syafiqah Hasshim, Roha Tukimin, Shamesh Raj A/L Parthasarathy

146. In Facing the Challenges of Islamic-Based Social Development through Mental Health Wellbeing ......................................................................................................................... 793
   Siti Nur Aafifah Hashim, Wan Norhaniza Wan Hasan
147. An Analysis of Mercury (Hg) Content in Drinking Water with Renal Dysfunction in the Traditional Gold Miners in Tahilete village, District of Rarowatu, Bombana Regency .......................................................... 798
   Lucia Yogyana Suramas, Anwar Daud, Agus Bintara Birawida

148. The Determinant Quality of Antennal Care in the Rural Area of Jeneponto Regency .............................. 804
   M. Wahidin, Ansariadi, Nurhaedar

149. Relationship of Management Functions Implementation with Health Workers’ Performance in Batua Public Health Centre at Makassar City ................................................................................................................. 809
   Machsur Tunggal, Yusri Abadi, Darmawansyah

150. Integrated Health Post Visit Frequency for 3 Months Consecutively Towards Children Development in Puskesmas Working Area at Makassar City ................................................................. 813
   Muh Iffah Nurhikmah, Burhanuddin Bahar, Djunaidi M. Dachlan

151. Effect of Musculoskeletal Ergonomics Chair on Silver Smith in Borong Villages, District Maggala, Makassar City ............................................................................................................................................. 818
   Muhammad Azrul Syamsul, Syamsiar S. Russeng, Fridawaty Rivai

152. Effect of Skill, Compensation and Job Satisfaction on the Nurses Performance at Emergency Unit in Anutapura General Hospital Palu 2016 ...................................................................................................... 823
   Munawarah, Alimin Maidin, Indahwaty Sidin

153. The Effect of Soybean Milk and Probiotic Drink on Total Cholesterol in Hypercholesterolemia Women in Makassar City ............................................................................................................................................. 827
   Nina Pratiwi N.D, Ida Leida Maria, Saifuddin Sirajuddin

154. The Correlation between Birth Weight and the Essential Fatty Acid Levels in the Milk of Breastfeeding Infants Aged 1 to 4 Months in Makassar ............................................................................................................................................. 832
   Nur Nikmah Sirajuddin, Veni Hadju, Ida Leida Maria

155. Relationship between Early Breastfeeding Initiation and Involution Uteri of Childbirth Mothers in Nenemallomo Regional Public Hospital and Arifin Nu’mang Public Regional Hospital of SidenrengRappang Regency in 2014 ............................................................................................................................................. 838
   Nurjanna, Suryani As’ad, Irfan Idris

156. The Pay Ability and Willingness to Pay for Treatment at Pangkajene Hospitals ....................................... 845
   Nurul Fajriah Istiqamah, Darmawansyah, Anran Razak

157. Analysis of KarebaBaji Community Role as Peer Educators in Healing Effect of Multi Drug Resistance Tuberculosis at RSUD LabuangBaji Makassar City ............................................................................................................................................. 851
   Rachmawati, Muh. Syafar, Ida Leida
158. Yellow Passion Fruit Peels (Passiflora edulis F. Flavicarpa Deg.) Juice effect on the Defecation Pattern of the Patients with Diabetic Mellitus Type 2 in Pinrang Regency ................................................................. 856
   Rahma, Citrakesumasari, Stang

159. The Giving of Exclusive Breastfeeding to Moronene Etnics of Bombana Southeast Sulawesi ............. 862
   Ratnawati, Indar, Burhanuddin Bahar

160. The Effects of Soybean Chocolate Drink Treatment on the Calcium Levels in Patients with Pulmonary Tuberculosis .............................................................................................................................. 869
   Rezky Amelia, Nurpudji A. Taslim, Citrakesumasari

161. Personal Hygiene among University Students in Hasanuddin University Hostel .................................. 874
   Rinda Limbong, Indra Fajarwati Ibu, Muh Arsyad Rahman

162. Influence of Microskill Learning Model Toward Student’s Psychomotor Learning Outcomes in Birth Delivery care Competence Scale II in Panrita Husada Health Science School, Bulukumba Regency ..... 878
   Rosnawati, Budu, Irfan Idris

163. Determinant Factor in Implementation of Early Initiation of Breastfeeding at Sentani Community Health Center Jayapura District ........................................................................................................ 883
   Rusmina Nasendi, Masni, Noer Bahry Noor

164. Implementation of First Level Outpatient Reference of BPJS Health Insurance Participants at Community Health Centres in Maros Regency .............................................................................. 889
   Septianus Bunga, Indar; Ariffin Seweng

165. Influence of Oxytocin Massage toward Oxytocin Concentration Chenage among Mothers in Siti Khadijah I Maternity Hospital, Makassar .............................................................. 893
   St. Subriani, Nasrudin A. M, Irfan Idris

166. Factors Associated with Medical Treatment Compliance among Leprosy Patients in Gowa District 2015-2016 ................................................................. 899
   Sucitra Erviana Hajid, Rismayanti Akhbar, Jumriani Ansar

167. Effect of Platelet and Haematocrit Contents towards Dengue Haemorrhagic Fever and Impact on Economic Loss in Daya Regional General Hospital 2016 ..................................................................... 903
   Sudirham, Arsunan Arsin, Alimin Maidin

168. Intermediate Determinants in Maternal Mortality: Case Study Tojo Una, Una District ....................... 908
   Syarifuddin, Ridwan Thaha, Andi Zulkifli Abdullah

169. Comparative of Sexual Satisfaction between Women with and without Tubectomy in Makassar 2015 .... 914
   Trisna Pangestuning Tyas, Nasrudin A. M, Irfan Idris

   Wa Ode Sri Kamba Wuna, Irfan Idris, Werna Nontji

171. Relationship between Night Sleep Quality with Changes in the Infants Body Length of age between one Month and Six Months ................................................................. 928
   Yola Arimbi, Sri Saadiyah, Mita Noviana

172. Relationship between Knowledge, Attitude and Motivation among Midwives in the Normal Labour Care Implementation ......................................................................................... 932
   Yuli Setiawati, Andi Wardihan Sinrang, Irfan Idris
173. Four Pillars Control of Blood Glucose Levels on the Patients with Diabetes Mellitus Type 2 in Ponre Village Bulukumba District ................................................................. 937
   Yuyun Ariska, H. Ridwan A, Indra Dwinata

   Abdul Rahman Akmal, Ridwan M. Thaha, Amran Razak

175. Factors Affecting the Success Early Initiation of Breastfeeding (EIBF) at Puskesmas Jumpandang Baru 2014 ................................................................. 949
   Adryani Mujur, Suryani As’ad, Irfan Idris

176. Relationship between Childbirth Duration and Postpartum Blues ................................................. 955
   Amalia Rizki Meilina, Nasrudin A. M, Budu

177. Correlation between Internal and External Factors toward Exclusive Breastfeeding on Working Mothers ................................................................. 960
   Andi Indah Mardhatillah, Nurhikmawaty Hasbiah, Andi Besse Ahsaniyah

178. Influence of Oxytocin Massage on Oxytocin Concentration Level and Involution on Postpartum Mothers in Siti Khadijah I Maternity Hospital, Makassar City ......................................................... 965
   Asyima, Nasrudin A. M, Irfan Idris

179. Utilization of Home Care Services among the Fishermen Community at Makassar City ................. 970
   Citra Ayu Lestari Hanisu, Suriah, H. Watief A. Rachman

180. The Relationship between Asymptomatic Urinary Tract Infections in Pregnant Women with Preterm Labor in RSKD IA Siti Fatimah Makassar ................................................................. 974
   Dahniar, St.Nurasni, Irfan Idris

181. The Behaviour of Consuming Alcohol of Adolescents in South Bolaang Mongondow Regency of North Sulawesi Province ................................................................. 980
   Dalviyani, Ridwan M. Thaha, Sukri Palutturi

182. The Effect of Yellow Passion Fruit Peel Juice (Passiflora edulis f. flavicarpa deg.) on HDL and LDL Levels in Type 2 Diabetes Mellitus Patients in the Working Area of Teppo Health Centre Pinrang Regency ...... 984
   Dhuha Itsnanisa Adi, Citrakesumasari, Stang

183. The Effect of Giving VCO (Virgin Coconut Oil) on the Nutritional Status of Under Nutrition Children Aged 24-58 Months Old in Bontoramba Subdistrict Jeneponto Regency ................................................. 990
   Diesna Sari, Rahayu Indriasari, Andi Zulkifli

184. Relationship between Yoga Exercise for Trimester III Pregnancy and Fetal Outcomes at Restu Maternity Hospital Makassar ................................................................. 997
   Eggy Widya Larasati, Nasrudin A. M, Budu

185. Relationship between Premenstrual Coping and Premenstrual Syndrome (PMS) among Female Midwifery Students in Kendari Health Polytechnic ................................................................. 1002
   Fehry Ramadhani Suradji, H. Andi Zulkifli, Indra Dwinata

186. Risk Factors of Obesity among Pregnant Women in Biringkanaya Sub District at Makassar City from 2014 to 2015 ................................................................. 1008
187. Risk Factors of Preeclampsia Women in Dr. Wahidin Sudirohusodo Hospital at Makassar City 2015 .......................................................... 1013
   Fitri Cicilia, Muhammad Ikhsan, H. M. Tahir Abdullah

188. The Effect of Moringa Oleifera Leaf Biscuit on the Increase of Body Weight and Upper Arm Circumference for Chronic Energy Deficiency among Pregnant Women in Bontoramba District Jeneponto Regency .......................................................... 1018
   Fitriani Kasim, Saifuddin Sirajuddin, Ridwan Amiruddin

189. Analysis of Effectiveness in Addition of Coffee and Brown Sugar on Wastewater Treatment in Regional Public Service Agency (BLUD) Haji Padjonga DG Ngalle Hospital at Takalar Regency ....................... 1024
   Fitriany, Anwar Mallongi, Syamsuar Manyullei

190. The Analysis of Health Risk Resulted from the Consumption of Tomatoes (Cyropollexesculentum) and Chili (Capsicum Annuum L.) which contain Profenofos Residues at the Vendor Daya Market, Biringkanaya sub district ........................................................................................................................................ 1029
   Ganda Kusuma Jaya, Anwar, M. Alimin Maidin

191. Correlation between the Level of Von Willebrand Factor (VWF) and Blood Pressure of Pregnant Women in Makassar City .......................................................... 1035
   Hardianti, Abdul Razak Thaha, Burhanuddin Bahar

192. Correlation between Body Mass Index and Physical Activity on Menstrual Cycle in Young Adult ...... 1040
   Hasmawati Rasyid, Andi Besse Ahsaniyah, Ita Rini

193. Factor Related to the Occurrence of Anemia and Obedience in Consuming FE Tablets in Pregnant Women at Mamajang Public Health Center, Makassar .......................................................... 1045
   Hastuti Husain, Ema Alasiry, Irfan Idris

194. Effect of Communication, Information and Education (CIE) on Knowledge and Decision Making of Married Women with Unmet Need in the Family Planning Program at Marusu District Maros City in 2016 .......................................................... 1051
   Husnah, Masni, Veni Hadju

195. Influence of Oxytocin Stimulation Massage toward Women Uterine Involution During Confinement Period with Normal Childbirth .......................................................... 1056
   Idha Farahdiba, A. Wardihan Sinrang, Budu

196. Smoking Behaviour and the Role of Teachers as Role Model in the Implementation of Smoking Free Area (SFA) In Schools: A Case Study at Sma Negeri 3 Makaletanatoraja District .......................................................... 1061
   Ignata Lusmiling Latiang, Sudirman Nasir, Masni

197. Differences in Implementation of Demonstration and Audio-Visual Media Methods on Psychomotor Learning Outcomes among Students for Pregnancy Examination .......................................................... 1066
   Ira Jayanti, Budu, Werna Nontji

198. Effect of Iron and Zinc Substance Giving through Fortification Rice on Stress Level of School Age Children in Islamic Boarding School Annihaykahkarawang .......................................................................................................................... 1071
   Ismi Nurwaqiah Ibnu, Razak M. Thaha, Suriah

199. Effect of Giving Zinc and Food Supplements to Pregnant Women on Growth, Development, and Child Morbidity Status in Takalar Regency of South Sulawesi in 2016 .......................................................... 1078
   Jumria, Burhanuddin Bahar,Arsunan Arsin
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Authors</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>200.</td>
<td>Female Sex Worker Behaviour against the Risk of HIV and AIDS Transmission in Ambon City</td>
<td>Kalmia, H.M. Rusli Ngatimin, Muhammad Rachmat</td>
<td>1084</td>
</tr>
<tr>
<td>201.</td>
<td>Relationship between Supplementary Minnesota Multiphasic Personality Inventory (MMPI) test toward Competency and Intranal Care Services among Midwifery Students in Tanawali Persada Health Science School, Takalar Regency</td>
<td>Lince Renden, Budu, Werna Nontji</td>
<td>1089</td>
</tr>
<tr>
<td>203.</td>
<td>Menopausal Symptoms and Menopausal Quality of Life during Transitional Period among Military Wives</td>
<td>Nur H.S., C.K. Tan, Normina A.B., M.S. Seghayat, F. Amini, Thiagarajah S., E.S.S. Tan</td>
<td>1104</td>
</tr>
<tr>
<td>204.</td>
<td>Tuberculosis: A Complication after Hematopoietic Stem Cell Therapy (HSCT) and Bone Marrow Transplant</td>
<td>Rafidah Binti Baharudin, Marjan Sadat Seghayat, Farahnaz Amini</td>
<td>1110</td>
</tr>
<tr>
<td>205.</td>
<td>Public Perspective and Engagement in Cognitive-Stimulation Activity to Preserve Cognitive Reserve among Seniors in Malaysia - A Pilot Study</td>
<td>Melisa A.S., Normina A.B., E.S.S. Tan, M.S. Seghayat</td>
<td>1115</td>
</tr>
<tr>
<td>206.</td>
<td>Quality of Life in Adults with Androgenic Alopecia</td>
<td>Lim Wan Chyi, Eugenie Sin Sing Tan, Chew Kek Lee, Navedur Rehman, Loh Wei Chao, Tan Chung Keat</td>
<td>1120</td>
</tr>
<tr>
<td>207.</td>
<td>Factors Associated with Beliefs and Attitudes in Organic Food Purchase among Adults in Klang Valley</td>
<td>Lee Keat Yan, Kavita Chirara</td>
<td>1126</td>
</tr>
<tr>
<td>208.</td>
<td>Assessment of Knowledge, Attitude and Practice of Malaysian Women towards Cervical Cancer Vaccination</td>
<td>Mohammad Arief, LohJia Ying</td>
<td>1132</td>
</tr>
<tr>
<td>209.</td>
<td>Body Dissatisfaction and Risk of Eating Disorder among UCSI University Non-Science Field Students</td>
<td>Joyce Tan Xi Jie, Shashikala Sivapathy</td>
<td>1139</td>
</tr>
<tr>
<td>211.</td>
<td>Emotional Intelligence As A Mediator Between Personality and Happiness Among Adolescents in Malaysia</td>
<td>Sim MS, Mohtaram R</td>
<td>1150</td>
</tr>
<tr>
<td>212.</td>
<td>Chronic Kidney Disease-Mineral and Bone Disorders Laboratory Profiles in Chronic Haemodialysis Patients</td>
<td>Djoko Santososo, Nirapambudi Devianto, Pranawa, Moh. Yogiantoro</td>
<td>1156</td>
</tr>
</tbody>
</table>
213. The Relationship between Estimated Glomerular Filtration Rate (EGFR) with Hepcidin in CKD Patients That Have Not Undergone Dialysis  
Decsa Medika Hertanto, Ami Ashariati, Nunuk Mardiana, Djoko Santoso  

214. Association of Glomerular Filtration Rate with Intact Parathyroid Hormone in Non-dialysis Chronic Kidney Disease Patients  
Djoko Santoso, Ach Syaiful Ludi, Nunuk Mardiana, Widodo  

215. Water Soluble Protein Optimized Extraction from Microalgae Spirulina Platensis  
Cynthia Dwi Anggraeni, Sudarno, Mochammad Amin Alamsjah  

216. Correlation between Intact Parathyroid Hormone Levels and Subperiosteal Erosion toward Phalanx Manus and Bone Specific Alkaline Phosphatase Level in Pre-dialysis Chronic Kidney Disease Patients  
Djoko Santoso, Nurita Indarwulan, Nunuk Mardiana  

217. Erythropoietin Potential as an Antiapoptotic Agent in ISCEMIC Stroke Using Unilateral Right Common Carotid Artery Occlusion (RUCCAO) Model  
Junaidi Khotib, Ika Ayu Mentari, Mahardian Rahmadi, Suharjono  

218. The Effect of Finasteride on Vascular Endothelial Growth Factor (VEGF) Expression in the Prostate Tissue and Bleeding Volume during Trans Urethral Resection of the Prostate (TURP)  
Kartiko Sumartoyo, Budiono, Ketut Sudiana, Soetojo, Sunaryo Hardjowijoto  

219. Effectiveness and Mechanism of Action of Vanadyl Sulfate in Increasing Pancreatic β Cell Proliferation of DM Mice Due to Streptozotocin Induction  
Khoirotin Nisak, Junaidi Khotib  

220. Differences of IPSS, Q Max and Prostate Volume Before and After Treatment with Combination of Dutasteride and Tamoxifen in BPH Patient without Urine Retention  
Kurnia P. Seputra, Doddy M. Soebadi, Hedromartono Widayat, Widoda J.P., Soetojo  

221. Effect of Erythropoietin Administration on Spermatogonium Amount, Sertoli Cell and Leydig on Rats Testis (Wistar Strain) after Vas Deferens Ligation Released  
Muhammad Surya Negara, Soetojo, Doddy M. Soebadi  

222. Substitution of Rice Bran with Phytase Enzymes in Commercial Feed on the Performance of Broiler  
Rahmasari Nur Azizah, Indah Mentari Lasunte, Mochamad Lazurdi, Budiarto, M. Anam Al Arif, Mirni Lamid  

223. Total Cholesterol and C-reactive Protein (CRP) Levels as Prognostic Markers for Urosepsis  
Septa Surya Wahyudi, Budiono, Tarmono, Soetojo, Doddy M. Soebadi, Sunaryo Hardjowijoto  

224. Application of a Photogrammetric Kinematic Model for Prediction of Lung Volumes in Adults: A Pilot Study  
D. Malarvizhi, Aruna Ramanan Sekar  

225. Physiotherapy in Wilson’s Disease –A Case Report  
Suresh.J, Janani  

226. Effect of Living Arrangements on Health Status of the Elderly in Malaysia  
Norehan Abdullah, Shamzaeffa Samsudin
227. Study on Heart Rate Visualisation Using Combination of Real Time Heart Rate Detection and Augmented Reality ................................................................. 1236
    Norazlin Mohammed, Junaidah Binti Idrus
228. Protective Effect of Various Lyoprotectant on the Survival of Antineoplastic Drug Producing Serratia Marcescens ................................................................. 1243
    Kavitha.R, Damodharan.N
229. Comparison between Dry Needling Versus Kinesio Taping in Patients with Tennis Elbow ............ 1250
    K.Guru Karthick, D.Malarvizhi, Komal Bhagat
230. Effect of Incentive Spirometry and Balloon Exercises to Improve Pulmonary Function for Type 2 Diabetes ................................................................................. 1254
    D Malarvizhi, Geetha Anandakrishnan
231. Design and Implementation of Health Care Video Monitoring System based on RTOS ............... 1260
    B.Raja, Ayesha Firdous, A. Mohammedishak, M. Anand
232. Artificial Voice for Speecheless ........................................................................................................ 1266
    K.S.Thivya, M.Anand
233. Comparative Analysis of Automated Applications using Fetal Ultrasound Images ....................... 1271
    Babbibi Rahmatullah
234. An Analysis on Social Support and Community Commitment in the Investigation of New Cases of Smear Positive Pulmonary TB in the Work Area of Donggala Health Centre, Donggala Regency, Central Sulawesi ................................................................. 1277
    Miradiantri Tule, Muh. Syafar; Alimin Maidin
235. Healthy Life Pattern Behind Related To the Movement ProgramFirst 1000 Days of Life in Gowa Regency of South Sulawesi Province ................................................................. 1284
    Muh Zaifullah, Ridwan M. Thaha, Suriah
236. Awareness, Knowledge and Attitude towards Nutrigenomics among Health Care Workers in Indonesia: A Preliminary Exploration ......................................................... 1289
    Widyawaty N, Tan C.K, Tan E.S.S, Seghayat M.S, Normina A.B
237. Consumption of Malay Herbal Medicine (MHMs) During Pregnancy and Postpartum ................ 1296
    Normina A.B., Noradilah T., Y.B. Ho, C.K. Tan1, M.S. Seghayat, Mirnalini Kandiah, A.Z. Aris, E.S.S. Tan1
238. Social Demand and Future Prospective of ‘Anti –Aging Medicine among Malaysians ................ 1302
    Ng CY, Seghayat MS, Tan ESS, Tan CK Amini F, Thiagarajah S, Sharma D, Normina AB
239. Predicts the Successfulness of a Trial Voidsig without Catheter (TWOC) through Urine Retention Volume, Detrusor Wall Thickness (DWT) and Intravesical Protrusion of Prostate (IPP) on Acute Urinary Retention (AUR) Patients Due to Benign Prostatic Hyperplasia (BPH) ......................................................... 1308
    Dian Kurniasari, Budiono, Tarmono, Hardjowijoto, Soetojo
240. Effectiveness of Virtual Reality Using PS4 Gaming Technology in Stroke Rehabilitation for Improving Upper Limb Function- A Pilot Study ................................................................................. 1315
    Suresh J, Harish C
<table>
<thead>
<tr>
<th>Article Number</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>245</td>
<td>A Study on Relationship between Internet Usage and Anxiety among Primary School Students</td>
<td>Mohd Rustam Mohd Rameli, Loh Shu Wen, Najua Syuhada Ahmad Alhassora, Mohamad Rasidi Pairan</td>
</tr>
<tr>
<td>246</td>
<td>Knowledge and Misconceptions regarding Hand Washing as Perceived by the Food Handlers in School Foodservice Operations</td>
<td>Nornazira Suhairem, Mohd Zolkifli Abd Hamid, Ahmad Nabil Md Nasir, Dayana Farzeeha Ali, Muhammad Khair Nordin, Hanifah Jambari, Nur Hazirah Noh@Seth</td>
</tr>
<tr>
<td>247</td>
<td>Determinants of Marital Adjustment among Married Persons in Ogbomosho Metropolis</td>
<td>Fasasi Lukman, Aqeel Khan, Adibah Bint Abdul Latif, Arieff Salleh Rosman, Azlina Mohd Kosnin, Mahani Mokhtar, Adigun Akeem Ayodeji</td>
</tr>
<tr>
<td>248</td>
<td>Relationship between Personality Traits and Preferred Academic Advising Style of Malaysian Public University Students</td>
<td>Norashuha Tajuddin, Hamdan Said, Faizah Mohamad Nor</td>
</tr>
<tr>
<td>249</td>
<td>Factors Influencing Career Progression of Working-Class Married Women in Oyo Metropolis</td>
<td>Fasasi Lukman, Aqeel Khan, Adigun Akeem Ayodeji</td>
</tr>
<tr>
<td>250</td>
<td>The Influence of Emotional Intelligence and Personality on Career Adaptability among Teachers in Special Education Schools in Johor Bahru</td>
<td>Bay Yan Er, Mohd Rustam Mohd Rameli</td>
</tr>
<tr>
<td>251</td>
<td>Coping Styles in Group Reality Therapy among Cardiac Women Patients with Depression</td>
<td>Racheal Entayang Kudang, Mohamed Sharif bin Mustaffa, Surena Sabil, Aqeel Khan, Fatahyah Yahya</td>
</tr>
<tr>
<td>252</td>
<td>Coping Strategies as a Mediator Between Stress and Marital Quality among Postgraduate Students</td>
<td>Ahmad Mustaqim Yusoff, Aqeel Khan, Adibah Abdul Latif &amp; Dzilal Abdul Aziz</td>
</tr>
<tr>
<td>253</td>
<td>An Examination of the Social-Emotional Competencies among Primary School Students</td>
<td>Ng Ching Yee, Yeo Kee Jiar</td>
</tr>
<tr>
<td>254</td>
<td>Parents’ Couple Relationship, Parent-Child Relationship and Emotion Regulation among Malaysian Children</td>
<td>Azlina Mohd Kosnin, Tu Chien Hui, Mohd Zaki Daud</td>
</tr>
<tr>
<td>255</td>
<td>Low Back Pain Risk Assessment for Construction Industry Personnel</td>
<td>Norzarina Othman, Yeo Kee Jiar</td>
</tr>
<tr>
<td>Page</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>256.</td>
<td>Impacts of Natural Disaster on Children: Development of the ‘MAIN’ as Inventory</td>
<td>Hafizah Harun, Rohaya Talib, Habibah @ Norehan Haron, Hamimah Abu Naim, Marlina Ali</td>
</tr>
<tr>
<td>257.</td>
<td>Addiction Rehabilitation and Structural Family Therapy</td>
<td>Raymond Shoup, Diana-Lea Baranovic</td>
</tr>
<tr>
<td>258.</td>
<td>A Preliminary Study of the Evaluation on the Dietary Pattern among Obese School Children</td>
<td>Norimah Said, Norazmir Md Nor, Siti Khuzaimah Ahmad Sharoni</td>
</tr>
<tr>
<td>259.</td>
<td>Examining a Model to Measure Green Packaging Practices Among Consumers in Malaysia: A Sustainable Contributor to Achieving Smart Environmental Goals</td>
<td>Chinnasamy Agamudai Malarvizhi, Sreenivasan Jayashree, Shamima Raihan Manzoor</td>
</tr>
<tr>
<td>260.</td>
<td>Role of Personality Traits in Sexual Misconduct among Malaysian Teenager</td>
<td>Aminah Binti Abdul Mannan, Aqeel Khan, Jamaludin Bin Ramli, Adibah Bint Abdul Latif, Ayesha Binti Abdul Mannan</td>
</tr>
<tr>
<td>261.</td>
<td>Overcome the Problem of Street Children Through Life Skill Learning in West Java Indonesia</td>
<td>Herwina Bahar, Zainudin Hassan, Iswan, Hanny Firas</td>
</tr>
<tr>
<td>262.</td>
<td>Effectiveness of Shaping Technique for Increasing Self Confidence among Minor Autistic Students Banjarmasin, Indonesia</td>
<td>Ririanti Rachmayanie, Nina Permata Sari, Zainudin Hassan, Desy Nurmiyanti</td>
</tr>
<tr>
<td>263.</td>
<td>The Self-Efficacy, Self-Regulation and Academic Motivation among Students</td>
<td>Syaidatul Nadrah Ahmad Tarmizi, Roslee Ahmad, Sapora Sipon, Rezki Perdani Sawai, Muhamad Khairi Mahyuddin, Muhammad Hizral Tazzif, Aqeel Khan</td>
</tr>
<tr>
<td>265.</td>
<td>Students’ Perceived Learning Environment for Self Regulation</td>
<td>Sook Ling Lim, Kee Jiar Yeo</td>
</tr>
<tr>
<td>266.</td>
<td>Retrieval Based Learning on Student Memory Retention Time: A Meta-Analysis</td>
<td>Noor Azizah Bt Aziz, Amirmudin Bin Udin</td>
</tr>
<tr>
<td>267.</td>
<td>A Systematic Review of Play-Based Intervention in Enhancing Social Skills Children with Autism Spectrum Disorder</td>
<td>Joanna Hie Ping Ting, Kee Jiar Yeo</td>
</tr>
<tr>
<td>268.</td>
<td>e-PBL: An Innovation to Promote Active Learning and Decrease Cognitive Overload among Medical Students</td>
<td>Heethal Jaiprakash, Anudeep Singh, Anupam Biswas, Jaiprakash Mohanraj, Sarmishtha Ghosh</td>
</tr>
<tr>
<td>Article Number</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>271.</td>
<td>Cholesterol and Triglyceride Indices Are Linked to the Left Ventricle Diastolic Dysfunction: An Echocardiography and Tissue Doppler Study</td>
<td>Suaad Muhssen Ghazi, Ismail Ibrahim Hussain, Aalaa Saad Adil</td>
</tr>
<tr>
<td>273.</td>
<td>Expression of Cyp2c8 Enzyme in Non-Small Cell Lung Cancer with 6Α-Hydroxy Paclitaxel Drug by Flow Cytometric Technique</td>
<td>Firas A. Hassan</td>
</tr>
<tr>
<td>274.</td>
<td>The Role of Prophylactic “Window” Hydrocelectomy in Prevention of Postvaricocelectomy Hydroceles</td>
<td>Ehab Jasim Mohammad, Waleed Nassar Jaffal, Duraid Taha Abdulkareem</td>
</tr>
<tr>
<td>275.</td>
<td>Analysis of Serum II-6 and CRP Levels among Autoimmune and Non-Autoimmune Hypothyroid Patients</td>
<td>Sahar H. A. Al-Hindawi</td>
</tr>
<tr>
<td>276.</td>
<td>Assessment of Overweight and Obesity with Life Style among Secondary School Students in Al-Ramadi City</td>
<td>Ban Nadhum AL-Any</td>
</tr>
<tr>
<td>277.</td>
<td>A Comparison Study among Several Tumor Markers in Serum Samples of Patients with Colon Cancers</td>
<td>Rasha Hasan Jasim</td>
</tr>
<tr>
<td>279.</td>
<td>Role of MicroRNA-122 in Predicting Chronic Liver Diseases among Iraqi Patients with HCV</td>
<td>Leena Falh Abd Al Reda, Dawood Salman Dawood, Akram Ajeel Najeeb</td>
</tr>
<tr>
<td>280.</td>
<td>Albumin Gradient and Sex Selection in Couples with Normal Seminal Fluid Parameters</td>
<td>Sumeya Ghanawy AL-Najjar</td>
</tr>
</tbody>
</table>
282. Effect of Laser Diode and Camellia Sinensis Extract on Some Blood Parameters of Male Laboratory Rats Infected with Arthritis .......................................................... 1550
Wafaa Abdulmutalib Naji, Alaa J. Mohammed, Mohammed Qasim Waheeb

283. The Antibacterial Activity of Zinc Oxide Nanoparticles Against Isolates from Internal Cavity of Dental Implant and Natural Teeth (in Vitro Study) ............................................. 1556
Dhyaa M J Hirz Al-Deen, Basima GH Ali, Abbas Sabri Al-Mizraqchi

284. Use of the Naive Bayes Function and the Models of Artificial Neural Networks to Classify Some Cancer Tumors ................................................................................................. 1563
Shrook A.S. Al-Sabbah, Sada Faydh Mohammad, Maryam Mahdi Eanad

285. Clinico- Epidemiological Study of Patients with Erectile Dysfunction Attending Al-Kadymia Teaching Hospital in Baghdad ................................................................. 1570
Atta Ah Mousa Al-Sarray, Waleed Arif Al -Ani Sameeha Naser Abed

286. Surface Roughness of Two Scannable Die Materials .............................................................................. 1577
Raja’a M. Albuha Al-Mussawi, Farzaneh Farid, Ola M. Aljibori, Athraa M. Dheyaa, Ahmad Reza Shamshiri

287. Gene Polymorphism of Interleukin 1β and Oxidative Stress in Gastritis Patients Infected with Helicobacter pylori..................................................................................................................1582
Suhayr A. AlQaysi, Heba M. ALKatawe, Huda AL-Hasnawy

288. Evaluation of Serum Cytokines IL-12, 17and 22 Levels in Patients with Brain Tumors ....................... 1589
Ahmed M.B. AL-Sherify; Mayada Farhan Darwesh, Musa Nima Mezher

289. Association between Two Different Methods for Determining Facial Types in Iraqi adults ................. 1595
Haider M. A. Ahmed

290. Assessment of the Knowledge Regarding Risk Factors and Preventive Measures of Chronic Diseases among Students of Southern Technical University in Basrah .................................................. 1599
Majid A. Maatook, Rajaa Ahmed Mahmoud

291. Histological Evaluation of Dental Pulp Response to Collagen with and without Laser Therapy ............ 1606
Ahmed D. N. Al-Agele, Ban Abdul Ghani Jamil

292. Investigation of Fungi Resistant to Disinfectants used in Burn Units at Baquba Teaching Hospital ....... 1612
Abbas M. AL-Ammari

293. Choosing of the Best Estimate of the Parameters of the Multiple Linear Regression Model of Infertility Using the Weighted Least Squares (WLS) and Robust M ............................................................................. 1617

294. Analysis of Toll-Like Receptor-4 Genes Polymorphism and Il-18 in Severe Chronic Periodontitis .... 1628
Raghad Fadhil, Nada M.H. AL-Ghaban, Batool Hassan Al Ghurabi

295. Evaluation of Students’ Knowledge, Practice and Attitudes Related to Antibiotics Use and Resistance in the Context of Iraqi Medical Education ................................................................. 1635
Mohammed Abdul-Hassan Jabarah AL-Zobaidy

296. Seroprevalence of Cytomegalovirus and Toxoplasma gondii in Infected Women in Babylon Province ........................................................................................................ 1642
Safaa A.AL-Isawi, Muhamed Ali Al Kabe, Ameer Kadhim Hussein, Zaytoon A. Al-Khafaji
297. A Comparative Study of Histopathological and Immunohistochemical Expression of MCM3 and MMP-2 in Pleomorphic Adenoma of Major and Minor Salivary Glands ................................................................. 1647
Zena A. Husein, Ban F. Al - Drobie, Bashar H. Abdullah

298. Study of the Effect of Some Trace Elements (Calcium) and Some in the Biochemical Variables on the Children of Thalassemia Patients in the Province of Maysan/ Iraq ................................................................. 1654
Farah Majbali jabber

299. Evaluation of Bone Metabolism Biomarkers in Hemodialysis Chronic Kidney Disease ...................... 1660
Firas Faris Rija, Zaid Mohmmed Mubarak Almahdawi, Sura Zahim Hussein

300. Estimation of TLR-4 and Cytokines Levels (Interleukin-1 Beta, Interleukin-8, and Tumor Necrosis Factor) in Serum and Peritoneal Fluid of Endometriosis Women ...................................................... 1666
Jinan Abdul-abbas Shamkhi, Ahmed Abdul-hassan Abbas, Thuraya Hussam Al-Deen

301. Application of a Rapid Method for Gram Differentiation of Human Pathogenic and Non-Pathogenic Bacteria without Staining (Short Communication) ........................................................................ 1673
Ruaa A. Talib, Abid Ali Abeid Abiess

302. Accuracy of Ultrasound in Diagnosis of Carpal Tunnel Syndrome in Correlation with Operative Findings ................................................................................................................................. 1676
Laith F. Farman Al hialy

303. Comparative Study of Hepcidin and Some Inflammatory Parameters in Pregnant Women at the Three Trimesters .......................................................................................................................... 1681
Suha Abdul-Khaliq Al-Jowari
A Study of Experiences of Beneficiaries, Enrollees and Stakeholders of Tamil Nadu Chief Minister’s Comprehensive Health Insurance Scheme (CMCHISTN) : A Qualitative Study

P Shirisha
JRF (Junior Research Fellow), Department of Humanities & Social Sciences, University- IIT Madras

Abstract

Recently many states in India have rolled out publicly financed health insurance schemes owing to the poor public health infrastructure. Tamil Nadu Chief Minister’s health insurance scheme is one such scheme launched in 2012. The qualitative design of the study pulls out some interesting themes vis-à-vis the problems faced by the providers as well as beneficiaries with respect to the scheme, the plight of the enrollees. Eight in-depth interviews were conducted with the insurance enrollees and beneficiaries in The Nilgiris district in the state of Tamil Nadu, India. The findings revealed the hardships faced by the beneficiaries to procure smart card both financial and physical. Four formal interview were conducted to gain insight on provider’s and other government officials perspective which revealed the problem of delayed reimbursements for the procedures performed to the providers and inputs on how the scheme could be improved based on population’s health needs.

Keywords: Tamil Nadu health insurance scheme, publicly financed health insurance, qualitative study, smart card

Introduction

The fierce competition in the commercial health insurance to acquire larger volume, lowered the premiums which made it affordable to the government and benefitted the development of Publicly funded health Insurance scheme at least in short term[1]. Tamil Nadu Chief Minister’s Health Insurance Scheme (CMCHISTN) is a health insurance scheme which was launched in 2012 by the chief minister of Tamil Nadu. The scheme is aimed at providing quality healthcare to families earning less than Rs.72,000 per annum are eligible for this scheme. Under this scheme a coverage of Rs,1 lakh per year is assured for a family of four members,[2]. As per Economic Survey 2015-16 brought out by Ministry of Finance, public expenditure on health (Centre and States) was 1.3% of Gross Domestic Product (GDP) and is amongst the lowest in the world[3]. Out of which enormous amount of government’s money has been invested in the implementation of publicly financed health insurance scheme in the past 7–8 years[4]. For instance a total of INR 370 billion (USD 587 million) tax money has been allocated for RSBY since 2008–09 (Ministry Of Health And Family Welfare & Ministry Of Labor And Finance)[5]. If the budgets of state sponsored schemes are also added, it amounts to significant proportion of public exchequer’s money ibid. While the study was carried scheme already finished three years since the CMCHISTN scheme has been rolled out and therefore it was worth studying the experiences of the target population with the insurance scheme.

Objectives

1. To understand the challenges faced by the beneficiaries in availing the scheme and reasons for non-utilisation.
2. To understand the perspectives of different stakeholders- government officials, beneficiaries, providers about the scheme.

Corresponding author:
P Shirisha
Designation- JRF (Junior Research Fellow)
Department of Humanities & Social Sciences
University- IIT Madras,
E-mail address- shirisha@zoho.com
Contact- 08667648398 / 9443018610
Materials and Method

Study design:

A Qualitative study design was implemented to gain insights into the experience of the stakeholders with scheme during 2015-16. A total of 12 interviews were carried out. Out of which 8 were in depth interviews with the enrollees and beneficiaries. Also, 4 formal interviews were conducted with the liaison officer, and vigilance officer of CMCHISTN for ‘The Nilgiris’ district and medical officers for perspectives from the provider’s side (Gudalur Adivasi hospital). In case of enrollees purposive sampling method was used to identify the beneficiaries.

The beneficiaries who were included in the study have been divided into 2 categories:

Those who have the smart card but didn’t avail it (enrollees).

Those who have the smart card and availed it (beneficiaries).

Different interview guides were prepared for both categories and in depth interviews were conducted with all these participants. The interviews with the beneficiaries lasted about 25-40 minutes on an average. The questions were open ended and were encompassing their experiences with enrolment in the scheme. The interview with the government officials and medical officers were conducted in English. While, with the beneficiaries it was in tamil. Notes were taken immediately in case of medical officer and government officials. Also, interviews with the beneficiaries were recorded and were transcribed later.

Sources of data:

Record of beneficiaries maintained by the CMCHISTN unit in Gudalur Adivasi Hospital. Database of tribal inpatient with sangam number maintained in Gudalur adivasi hospital

Primary source:

Primary data was collected through in depth interview with the enrollees, beneficiaries, other stakeholders and the interviews with medical officers and liaison, vigilance officer of the CMCHISTN unit of the Gudalur Adivasi hospital.

Secondary data source:

The records of surgeries performed on the inpatients maintained by the Gudalur Adivasi hospital.

Key Findings:

Provider’s Perspective:

Non-coverage of basic surgeries in private hospitals:

A list of frequently performed surgeries for tribal patients was tabulated from the database maintained by Gudalur adivasi hospital for year 2013-15 and was compared with the list of surgeries enlisted under the scheme. Basic surgeries such as hernia, varicose vein, appendicectomy, oophorectomy, respiratory infections, caesarean section and post-partum sterilization were covered only if one avails the scheme in government hospitals. For instance hernia with mesh repair and other types are covered but simple hernia isn’t covered. So, the private hospitals will be allured to use mesh even in simple cases of hernia. Only in tribal patients in Gudalur adivasi hospitals, many of these basic surgeries accounted for 246 of total cases that were carried out since inception of the scheme. All these cases couldn’t be covered.

‘Many basic surgeries are covered only when the patient goes to the government hospital... inguinal hernia, hysterectomy until unless because of carcinoma, varicose vein, salpingo oophorectomy are the commonest basic surgeries performed in our hospital. We’ve requested so many times to include them, but there is no response’ –

-Medical Officer, CMCHISTN, GAH

Beneficiaries’ Perspective:

1. Issues With The procurement of Smart Card

1a. Time taken for procuring the smart card (kapidhittum card):

If the enrollees have the necessary documents required to obtain Smart card by the VAO (Village administrative officer), then the card should be issued on the same day when the application for smart card is submitted.

‘If the beneficiary goes to the collectorate with the required document (Village Administration Officer’s certificate and ration card) then they should get the smart card within 10-15 minutes of the request’
– vigilance officer (CMCHISTN, The Nilgiris)

Only in 5 out of 8 cases the beneficiaries suffered prolonged delay in availing the card and in 1 case the beneficiary didn’t get the smart card still. For getting the smart card the beneficiaries have to go to the CMCHISTN unit, collectorate office, . In none of the cases it was issued on the same day. Rest of the cases, beneficiaries had to visit to and fro, only to listen come next time.

In case of one beneficiary the reason quoted for delay was that the documents will go first to Ooty and then Chennai that is why it took 6 months

‘I kept on going to CMCHISTN unit, Ooty 2-3 times every month, they will be out going for lunch or somewhere and I’ll be waiting there throughout the day’

-Beneficiary X (CMCHISTN)

1.b Leave and loss of wages for procuring card:

The beneficiaries had to take leave from work due to which they had to suffer loss of wages.

‘I had to take leave from hospital (to travel to ooty for smart card) due to which the management at hospital would scold me. I used to go there (CMCHISTN unit, ooty) and they would turn me away saying it (smart card) didn’t arrive,

-Beneficiary Y (CMCHISTN)

1.c Differences in modes of procurement of smart card:

There were different ways how the beneficiaries got the smart card. In 3 out of 8 cases the beneficiaries didn’t go to the CMCHISTN unit at ooty to get the smart card but they got it in ration shop and taluk office. One of the enrollees had the old Kalaignar card (smart card issued by the earlier government), which she exchanged in the ration shop and got the amma’s ‘kappidhitthu’ (smart card) immediately. Other beneficiary submitted the application for ‘kappidhitthu’ along with the required documents in the taluk office and got the smart card within a week. All these beneficiaries got their smart card in the same year .i.e. 2012. However, in one case the beneficiary had lot of problem in renewing the old smart card with new smart card. She went to more than three times for surrendering the Kalaignar and to get the new smart card.

‘When I went to CMCHISTN unit, Ooty’ they asked me to come next week, then I talked to her (Liasion officer), she told me to call in the helpline number, the official told me to ask them to put the name in emergency list. When I went to my name was already there in the emergency list but now election work is going on.

-Beneficiary P (CMCHISTN)

‘I asked dr.M To call them because she has some contacts there, but that too didn’t work. I told Mrs.S(liason officer) again she called Mr. X (Project officer) and asked him about the card and he talked to me and said that come tomorrow and collect your card, they were simply withholding my card. Finally I got the card after 2 months’

-Beneficiary Q (CMCHISTN)

In 3 out of 8 cases reference from the doctor at Gudalur adivasi hospital was used, either they will issue a letter or they will call directly that the beneficiaries’ case is an emergency case and the card should be issued immediately. Later during emergency conditions the beneficiary has to run for the card in the mean time. People who are not having any reference have more difficulty in getting the card relatively.

Issues in procuring basic documents:

Beneficiaries faced problem in procuring documents like ration card and income certificate also.

Ration card:

In two cases there was a long delay as much as 6 months and One beneficiary applied twice and got the ration card after 1 and a half years, the reason stated was that the address provided wasn’t correct. The female respondents got their name added in the ration card after marriage and didn’t had much problem.

Income certificate:

For getting income certificate, invariably all the beneficiaries except one case went at least 3-4 months to the taluk office. In one case the beneficiary had also to bribe for getting it

‘I went to Its village administration office, one person will say go to him, other will say the same and so on….it happened for 7 days after which I got the income certificate. The office people asked me for some money for ‘chai” (tea).
Beneficiary M (CMCHISTN)

To approach frequently to the office in location far from the place of residence means leave from work, loss of wages and travel expenses, these added to the agony to the procedure. In some cases the beneficiary had to wait for applying for smart card because of delay in getting income certificate.

'I got the income certificate after 3 months and therefore got late in applying for smart card'

Beneficiary P (CMCHISTN)

The beneficiary who applied online got it within a week. In one case the beneficiary stated that there is an emergency and received the income certificate within 4 days of application though the beneficiary had to go and wait everyday in the office.

Awareness about the scheme:

None of the beneficiaries except one knows about hospitals in their area where they could avail this scheme. Except 3 participants the rest 5 didn’t had any knowledge that the scheme is completely cashless and includes transportation and food costs. Only 2 participants knew the maximum limit of amount of the cover provided under this scheme. Also just 2 participants used the helpline number to enquire about their problems.

Experience of beneficiaries while availing the scheme:

Totally cashless scheme:

All the beneficiaries who availed the scheme and undergone any procedure enlisted under the scheme stated there was no delay or problem in getting admission in the hospital and also there was no procedural negligence. All the beneficiaries have given a positive response about the benefit from the scheme. In some cases the vigilance commissioner met in person to check whether they were charged anything, or for identification of the beneficiaries whether the patient is fake or is actually there. The beneficiaries were positive about the vigilance officer’s response and the scheme overall for hospital admissions.

'The cost (if the scheme wasn’t available) that we would had incurred for radiation, operation and injections, would had been huge’ –

Beneficiary V (CMCHISTN)

The scheme is helpful and important to us that is why I have been struggling and running here and there to get the smart card

Beneficiary Q (CMCHISTN)

All of the beneficiaries had cashless treatment for the procedures ranging from chemotherapy, cholecystectomy to angiogram etc. In one case the money was taken but was reimbursed before discharge

Discussion & Conclusion

Latest round of NSSO (NSSO 71st round) highlights inequity in enrolment under PFHIS with lower quintile enrolled lesser than fifth quintile. The inequity may arise due to hardships faced by the target population, hence they discouraged to take up the scheme. A study demonstrates conclusive proof that RSBY and other state government-based interventions failed to provide financial risk protection. However, Early evidence from studies on PFHI schemes- like RSBY suggests that the catastrophic headcount due to hospitalization was higher for districts which had any kind of insurance rather than those which didn’t had any, also there was marginal decline in the share of medical expenditure, mainly attributed to decline in outpatient expenditure. Another study has shown that there has been significant reduction in OOP expenditure but nevertheless in Catastrophic Health Expenditure (CHE). All the PFHI schemes except RSBY and Yeshasvini cover low-frequency, high-cost tertiary care procedures, this excludes the outpatient expenses and drugs which dominates the CHE. Despite the aim of providing financial security these schemes have delivered less than expected. The target population of the scheme are the poor families (BPL) mostly engaged in unorganized sector whose livelihood depends on daily wages or meagre salaries. As many respondents stated that they travelled to the district office of CMCHISTN for enrolment which was far than their residence, there was constant trade-off trade between losing the wage, or delay in enrolment including unforeseen costs like expenses in travelling. But even if they forego a day’s wage for procuring card, the enrolment on the same day was highly unlikely. In cases where the patient is suffering with debilitating illness/acute episodes of illness it becomes all the more difficult as the member may be the only caretaker of the patient and going to the office and fetching the card may be an arduous task. Also, the awareness about the benefits that the scheme offers is low. The providers grappled with problems like delays in reimbursements and also non-inclusion of few
basic commonly performed surgical procedures out of the list of procedures covered. This is an important point as in cases where the government hospitals are either far away or ill-equipped to perform even basic surgeries, private hospital are the mainstay for the beneficiaries. But some studies found significant reduction in OOP expenses on healthcare due to the PFHIS schemes\textsuperscript{10,11} \textsuperscript{12}. The experience of the study participants are also in congruence of above study findings that there is no out of pocket expenditure and also benefitted those families who could otherwise not afford the expensive inpatient services in private setups.

**Ethical Clearance-** Taken from TISS ethical committee

**Source of Funding-** Self

**Conflict of Interest -** Nil

**List of abbreviations:**

BPL-Below poverty line  
IEC- Information education and communication  
OOP- Out of pocket expenditure  
PFHIS- Publicly funded health insurance scheme  
RSBY- Rashtriya swasthya bima yojana  
RACHI- Rajiv Arogyashree comprehensive health insurance  
RGJAY-Rajeev Gandhi Jeevandayee Arogya Yojana  
TNHSS- Tamilnadu Health system society

**References**


Effectiveness of Self Myofascial Release, Static Stretching and Neural Tissue Mobilization on Hamstring Flexibility in Athletes

Gatha Patel¹, Khushboo Bathia², Smita Kanase³, Amrutkuvar Pawar⁴, Vishnupriya Deshpande⁵, Prachi Jain⁶

¹Physiotherapist, ²Assistant Professor, ³Assistant Professor, ⁴Assistant Professor, ⁵Physiotherapist, ⁶Physiotherapist, Faculty of Physiotherapy, Krishna Institute of Medical Sciences ‘Deemed to be’ University, Karad, Maharashtra, India

Abstract

Context: Day by day, sports participation in youth is increasing. Due to increased participation, exercise related injuries are increased. Repeated Exercises causes microtrauma leading to fibrous tissue adhesions which further leads to decreased flexibility ultimately leading to Musculoskeletal dysfunctions.

Aim: To study the effectiveness of Self Myofascial Release, Static Stretching and Neural Tissue Mobilization on Hamstring flexibility in athletes

Methodology: 80 subjects of the age group 18-25 were randomly allocated to receive Self Myofascial Release and Static Stretching (Group A) and Neural Tissue Mobilization (Group B). Group A was given 3 sets of Foam Rolling for 30 to 60 seconds combined with 3 sets of static stretching for 20 to 30 seconds hold. Each subject was assessed for Active Knee Extension and Straight Leg Raise at baseline and immediately post-treatment.

Results: Both the interventions significantly improved AKE and SLR immediately post treatment within the groups whereas the inter group analysis showed significant difference in AKE between Groups but no significant difference was found in SLR.

Conclusion: Self Myofascial Release combined with Static Stretching and Neural Tissue Mobilization both were effective in improving Hamstring Flexibility, but Neural Tissue Mobilization was found to be superior.

Keywords: Hamstring tightness, Athletes, Self Myofascial Release, Static Stretching, Neural Tissue Mobilization

CTRI Reg. No: CTRI/2018/01/011479

Introduction

Sports participation in youth is increasing day by day. As a result of increased participation, exercise related injuries are increasing resulting in pain further deterring individuals from continuing the exercise regimen. Repeated and strenuous exercise causes repeated microtrauma to muscle fibers, leading to formation of fibrous tissue adhesions which further results in tightness, decreased flexibility, and decreased range of motion ultimately leading to musculoskeletal dysfunction.

In spite of hamstring tightness being the primary cause in majority of Musculoskeletal problems, it is often neglected in assessment and people concentrate on secondary dysfunctions such as musculoskeletal and soft
tissue injuries as in patellar tendinopathy, patellofemoral pain and hamstring strain injury.\(^{(4)}\)

Baseline Bubble Inclinometer™ was used because the inclinometer has been demonstrated to possess good to excellent reliability (ICC > .088) in studies examining both hip and shoulder.\(^{(18)}\)

Various tests assess hamstring tightness which include 90-90 Straight leg raise test, Hamstring contracture test, Tripod sign, Straight Leg Raise (SLR).\(^{(5)}\) Hamstring Contracture Test and Tripod Sign are not commonly used as their reliability and validity values are not available whereas for SLR and Active Knee Extension (AKE), the reliability were found to be good (0.861) and excellent (0.953) respectively.\(^{(7)}\)

Literature supports the use of many physiotherapeutic interventions namely, Positional Release Technique (PRT)\(^{(8)}\), Active Release Techniques (ART)\(^{(9)}\), Muscle Energy Techniques (MET)\(^{(10)}\), Stretching and Self Myofascial Release (SMR) and Neural Tissue Mobilization for muscle flexibility.

Studies found SMR and Neural Tissue Mobilization individually to be effective in improving flexibility. But, no studies till date have compared SMR followed by Static Stretching and Neural Tissue Mobilization in management of Hamstring tightness. So the present study aims to examine the superior treatment in the management of Hamstring Tightness.

**Materials and Methodology**

**Study Design**

The study was outcome-assessor blinded, clinical trial.

**Clinical Trials Registration**

The study was registered in Clinical Trials Registry-India with the no. CTRI/2018/01/011479 and the reference no. REF/2017/12/016564.

**Participants**

Eighty subjects (30 men, 50 women) with Hamstring Tightness were taken. Inclusion criteria was patients of the age group 18-25, with hamstring tightness of 20°; who were unable to achieve greater than 160° of knee extension with hip at 90° flexion and also those who were unable to reach 70° hip flexion in a SLR.\(^{(6)}\) Subjects with fractures of lower limb, soft tissue injuries, surgical procedures in previous 12 months and with history of musculoskeletal injuries were excluded. The subjects were randomly allocated into A) SMR and Static Stretching group \((n=40)\), B) Neural Tissue Mobilization group \((n=40)\)

**Interventions**

The subjects in Group A received SMR using foam rollers for hamstrings followed by Static Stretching. The procedure of doing SMR was demonstrated prior to the treatment. The subject lay on the exercise mattress and rolled the tested extremity to and fro from the ischial tuberosity to the back of the knee for 60-90 secs. The hands of the subject were fixed on the floor during the rolling motion. The body shifted back and forth. The subjects were asked to place maximum weight over the tested extremity. After SMR, Static Stretching was passively given by the therapist after the subject lay supine on the exercise mattress and then moved the tibia to terminal position of knee extension to the point where the subject complained of a feeling of discomfort in the posterior thigh. The position was maintained for 20 to 30 seconds and was repeated 4 times.

Group B was given Neural Tissue Mobilization technique. The subject was positioned supine. The extremity to be tested was placed on the therapist shoulder. The subject’s hip was passively flexed by the therapist with knee in extended position to a point where subject complains of a feeling of discomfort in hamstring. At this point, the hip was rotated medially and the foot was dorsiflexed by the therapist and this position was maintained for 6 seconds and the tested extremity was then bought to resting position and the same procedure was performed thrice.

**Outcome measures**

Outcome Assessment was done pre and immediately post treatment.

Active Knee Extension: The subject lay in supine position on the table. The non-examining extremity is secured with a Velcro strap across the middle of the thigh. A stabilization stool is placed on the table to help the subject accurately maintain the hip flexion to 90°. The subject is told to extend the knee and stop at the point where he first felt the stretch sensation at the posterior thigh area. The knee flexion angle is determined
by Baseline Bubble Inclinometer™. Inclinometer is positioned on the mid-point of the anterior surface of tibia, which is determined by using measuring tape to measure the participant’s tibia length from the medial malleolus to the medial tibial condyle. The tested extremity is extended and the angle displayed on the Inclinometer is recorded at the point where the subject verbally reports discomfort.

Straight Leg Raise: The subject lay in supine position on the table. The non-examining extremity is secured with a Velcro strap across the middle of the thigh. The subject is instructed to flex his hip, to the point where he complains of a feeling of discomfort in the posterior thigh. The angle is determined by Baseline Bubble Inclinometer. Inclinometer is positioned on the mid-point of the anterior surface of tibia, which is determined by using measuring tape to measure the participant’s tibia length from the medial malleolus to the medial tibial condyle. The tested hip is flexed and the angle displayed on the Inclinometer is recorded at the point where the subject verbally reports discomfort.

Statistics

Data were analyzed using SPSS version 20.0, Chicago.

Results/ Findings

Descriptive data of outcomes are shown in Table no.1 & 2. The intra group analysis was done using paired- t test. The inter group analysis was done using unpaired- t test.

- **Active Knee Extension (Table no.1):**

  In Group A, the mean ROM score pre intervention was 132.52 which increased to 146.42 post session. The p value by paired-t test was found to be <0.0001 which was extremely significant. In Group B, the mean ROM score pre intervention was 137.32 which increased to 155.9 post session. The p value by paired-t test was found to be <0.0001 which was extremely significant.

- **Straight Leg Raise (Table no.1):**

  In Group A, the mean ROM score pre intervention was 47.95 which increased to 64.17 post session. The p value by paired-t test was found to be <0.0001 which was extremely significant. In Group B, the mean ROM score pre intervention was 47.6 which increased to 68.85 post session. The p value by paired-t test was found to be <0.0001 which was extremely significant.

- **Active Knee Extension (Table no.2):**

  On comparing the pre-interventional values for AKE, the results between the two groups revealed that there was no statistically significant difference of ROM with p value 0.0630. While on comparing the post-session values, the results between the two groups revealed that there was extremely significant difference of ROM scores with p value of 0.0001. Pre-treatment shows that there was no significant difference in the ROM scores of AKE with p= 0.0630, whereas post-treatment shows extremely significant difference in the ROM scores with p=0.0001.

- **Straight Leg Raise (Table no.2):**

  On comparing the pre-interventional values for SLR, the results between the two groups revealed that there was no statistically significant difference of ROM with p value 0.8880. While on comparing the post-session values, the results between the two groups revealed that there wasn’t quite significant difference of ROM scores with p value of 0.0515. Pre-treatment shows that there is no significant difference in the ROM scores of SLR with p= 0.8880, whereas post-treatment shows quite not significant difference in the ROM scores with p=0.0515.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Active Knee Extension</th>
<th>Straight Leg Raise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre- treatment</td>
<td>Post-treatment</td>
</tr>
<tr>
<td>GROUP A</td>
<td>132.52 + 11.71</td>
<td>146.42 + 11.75</td>
</tr>
<tr>
<td>GROUP B</td>
<td>137.32 + 11.03</td>
<td>155.9 + 7.97</td>
</tr>
<tr>
<td>P VALUE</td>
<td>P &lt; 0.0001</td>
<td>P &lt;0.0001</td>
</tr>
</tbody>
</table>
Table no 2: Comparison of pre-pre and post-post intervention of AKE and SLR between the groups.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Active Knee Extension</th>
<th>Straight Leg Raise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre- treatment</td>
<td>Post-treatment</td>
</tr>
<tr>
<td>GROUP A</td>
<td>132.525 ± 11.719</td>
<td>146.425 ± 11.754</td>
</tr>
<tr>
<td>GROUP B</td>
<td>137.325 ± 11.035</td>
<td>155.9 ± 7.974</td>
</tr>
<tr>
<td>P VALUE</td>
<td>0.0630</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Discussion

Subjects in Group A were given SMR with Foam Rollers and Static Stretching. The mean ROM scores for AKE were increased from 132.52° to 146.42° and for SLR it was increased from 47.95° to 64.17°. In accordance with the results of our study, an increase in sit-and-reach scores was noted from 0.97 inches to 2.46 inches using foam rolling followed by static stretching. The probable reason for improvement in flexibility using foam rollers could be due to decrease in overactive myofascial tissues and application of pressure to the trigger points causing the Golgi Tendon Organs to elicit an inhibitory effect on the muscle, allowing it to become less tense and ultimately leading to increased joint ROM and improved flexibility.\(^{(19)}\)

We gave four sets of 20 to 30secs of foam rolling to hamstring muscle which showed statistically significant improvement in Hamstring Flexibility. Similarly, MacDonald, et al reported increase in ROM and performance measures by using foam roller for minimum of 90secs (three sets of 30secs\(^{(23)}\) or two sets of 1 min)\(^{(20)}\).

Multiple theories are available in our literature. One of the theory explains about the thixotropic property of fascia which states that if rolling friction is applied to the fascia, it generates heat and the fascia becomes more gel like allowing for a greater flexibility.\(^{(21, 20)}\) In contradictory to this, Schleip pointed the fact that the effect will only be present when the heat or pressure is applied.\(^{(22)}\)

Subjects in Group B were given Neural Tissue Mobilization which was also found to be effective in improving ROM by 18°. This could be due to viscoelastic changes in the muscle connective tissue. Shrinivas et al, reported similar results when compared Mulligan’s bent leg raise and Neural Tissue Mobilization. Similar to our study, Neural Tissue Mobilization was given thrice and the position was maintained for 6secs and the results came to be extremely significant with difference of 17° for AKE and 18° for SLR.\(^{(5)}\)

A study by Yun-hyeok-Shin et al showed that Sciatic Nerve Mobilization increases flexibility by 8%.\(^{(17)}\) Sandeep Singh et al, evaluated effects of Neural Tissue Mobilization and PNF Stretching and found both techniques to be equally effective.\(^{(15)}\)

Present study and aforementioned studies differ in respect to the methods of neural mobilization employed, its duration, type of participants involved and outcome measures used but inspite of this the results were positive. This is the reason we implicated Neural Tissue Mobilization in our study.

Between group comparison demonstrated that extremely significant difference existed in improvement scores on AKE \((p=0.0001, t=4.219)\). But statistically significant difference was not seen in scores on SLR \((p=0.0515, t=1.978)\).

Inconclusive results of the SLR may be due to inconsistency of pelvic position, posterior pelvic rotation, hip joint capsule stretch and possible neural stretch. Another possible cause may be the subject’s inability to keep the knee fully extended during SLR which may be because of weakness of hip or trunk flexors.\(^{(25)}\)

Conclusion

Study concluded that SMR with Static Stretching and Neural Tissue Mobilization both were effective in improving Hamstring Flexibility, but Neural Tissue Mobilization was found to be superior in improving Hamstring Flexibility.

Conflicts of Interest: Further studies can focus on strength testing of Hip and Trunk Flexors to maximize the increase in ROM and long term follow up to check the efficacy of the treatment.
**Source of Funding:** Krishna Institute of Medical Sciences Deemed to be University, Karad

**Ethical Clearance:** The study was approved by the institutional ethics committee of KIMSDU.

**References**


17. Yun-hyeok Shin1, Seung-chul Chon2. The Effects of Sciatic Nerve Mobilization on Hamstring Flexibility, Lower Limb Strength and Gait Performance in Patients With Chronic Stroke.


20. MacDonald GZ, Button DC, Drinkwater EJ, Behm


Effect of Ground Level Reverse Treadmill Walking Versus Incline Reverse Treadmill Walking as an Adjunct to Conventional Physiotherapy in Chronic Knee Osteoarthritis Subjects

Amruta Khilwani¹, Amrutkuvar Pawar², Trupti Warude², Khushboo Bathia²

¹Physiotherapist, Faculty of Physiotherapy, KIMS ‘Deemed to be’ university, Karad, Maharashtra, India,
²Assistant Professor, Krishna College of Physiotherapy, KIMS ‘deemed to be’ university, Karad, Maharashtra, India

Abstract

Background: Osteoarthritis (OA) is a common, chronic, degenerative joint disorder which leads to pain, decrease functional activity and decreases quality of life. The following study was carried out to compare the effect of ground level reverse treadmill walking, incline reverse treadmill walking and short wave diathermy along with conventional exercises in chronic osteoarthritis subjects.

Objectives: To compare the effect of ground level reverse treadmill walking, incline reverse treadmill walking and short wave diathermy along with conventional exercises in chronic osteoarthritis subjects.

Method: The study was conducted at physiotherapy outpatient department of Krishna Hospital and MRC, Karad. Sample size was 60 which were further divided into 3 groups each containing 20 subjects by simple random sampling method. Group A was given Ground level reverse treadmill walking along with SWD and conventional exercises. Group B was given incline reverse treadmill walking along with SWD and conventional exercises while Group C was control group which was given only SWD and conventional exercises.

Result: Paired t-test and ANOVA were used for statistical analysis. In pre intervention, there was no statistically significant difference seen in p values for VAS which was 0.2096 and for SF-36 was 0.6602 but was statistically very significant difference seen in p values for WOMAC that was 15.17. On comparing the post intervention score, the results showed very significant difference for VAS with p value 0.0028 while extremely significant difference was seen with p-value for WOMAC and SF-36 was <0.0001 respectively.

Conclusion: The study concluded that incline reverse treadmill walking along with SWD and conventional exercises was more effective in decreasing the pain, stiffness and improving quality of life in subjects with chronic knee osteoarthritis.

Keywords: Chronic knee OA, Ground level reverse treadmill walking, incline reverse treadmill walking, SWD, VAS, WOMAC, SF-36.

Introduction

Osteoarthritis (OA) is a common, chronic, degenerative joint disorder characterized by joint pain, tenderness, limitation of movements, crepitus, occasional effusion, and variable degrees of local inflammation, without systemic manifestations¹,². Individuals with OA of the weight bearing joints are considered to be less...
active and less fit $^{3,4}$

Osteoarthritis is classified as primary or secondary. The process in which articular degeneration occurs in the absence of an obvious underlying abnormality is known as primary osteoarthritis. Repetitive motion, injury or trauma found in certain occupation often leads to secondary osteoarthritis. It can also result from congenital conditions, and underlying diseases, endocrine diseases, bone dysplasia and calcium crystal deposition disease. $^{5}$ Osteoarthritis (OA) a common disease of aged population and one of the leading causes of disability. Incidence of knee OA is rising by increasing average age of general population. Age, weight, trauma to joint due to repeating movements in particular squatting and kneeling are common risk factors of knee OA. Several factors including cytokines, leptin, and mechanical forces are pathogenic factors of knee OA. In patients with knee pain attribution of pain to knee OA should be considered with caution. Since a proportion of knee OA are asymptomatic and in a number of patients identification of knee OA is not possible due to low sensitivity of radiographic examination. In this review data presented in regard to prevalence, pathogenesis, risk factors. **Key Words:** Knee, Osteoarthritis, Pathogenesis, Prevalence

The major risk factors of knee osteoarthritis are history of diabetes, cancer, or cardiovascular disease and the presence of walking disability. Knee Osteoarthritis is more important not only for its high prevalence rate compared with other types of Osteoarthritis but also for its presentation at earlier age groups particularly in younger age groups of obese women. $^{6}$

Knee OA is not a localized disease of cartilage alone but it also includes chronic disease of the whole joint, including articular cartilage, ligament, meniscus, , and peri-articular muscle that may result from multiple pathophysiological mechanisms which affects millions of patients $^{7}$. The aetiology include various mechanical, biomechanical, and genetic factors. The cardinal symptoms that suggest a diagnosis of OA include: pain, reduced function, stiffness, joint instability, buckling or giving way, reduced movement, deformity, swelling, crepitus $^{8}$

The goals of treatment are Pain relief, improved quality of life, improved mobility, improved walking, and Delayed progression of osteoarthritis $^{9}$

Retro walking has more advantageous effects compared to forward walking. During forward walking knee joint flexes, extends and then flexes in support phase, whereas in retro walking knee initially extends, flexes and then extends in support phase, prior to extending and flexing during swing. Retro walking increases stride rate, decreases stride length and increases support time. $^{10}$

Incline walking on a treadmill increases higher firing rate of hamstrings and quadriceps which helps in increase in knee extension moment, increasing strength in functional range and improving physical function. $^{11}$

Short wave diathermy (SWD) is a modality suggested for the management pain and loss of function due to osteoarthritis. Diathermy uses shortwaves which produce deep heat changes within the tissue including vasodilatation, elevation of pain threshold, increase tissue extensibility and increase enzymatic activity. $^{13,14}$

Exercise helps in decreasing pain, improving strength and Endurance, improving range of motion and connective tissue elasticity as well as exercise decreases functional limitation by Improving walking speed, gait, physical activity and decreasing Depression and anxiety. $^{15}$

There is paucity of literature when it comes to find the comparative effectiveness between ground level reverse treadmill walking as well as incline reverse treadmill walking along with conventional physiotherapy for Chronic OA knee. So there is need to find out newer methods of Physiotherapy treatment approaches which can aid in better outcomes, speedy recovery and reducing rehabilitation time.

**Method**

It was an comparative study in the physiotherapy department of Krishna institute of medical sciences. Ethical permission was obtained from institutional ethical committee, KIMSDU, Karad.60 subjects were equally divided into 3 groups using lottery method and selected according to inclusion and exclusion criteria. Written informed consent form was taken, and the whole study was explained to them. A detailed musculoskeletal evaluation was done. Inclusion criteria: (1)Both male and female participants willing to participate in study aged above 50 years.(2)Morning stiffness lasting <30 min.(3)Crepitus with active motion.(4)Bony tenderness.
(5) No warmth to touch. (6) Patients having knee pain for more than 6 weeks. (7) Subjects with clinical diagnosis and radiographic evidence of OA knee. (8) Kellgren-Lawrence radiographic grade 2 and 3. (9) Subjects who can walk reverse on treadmill without any discomfort.

Exclusion criteria: (1) Grade 3 obese individuals with deformed knees. (2) Systemic arthritis. (3) Soft tissue injuries around the knee joint. (4) Recent surgeries around the knee joint. (5) Elderly subjects with balance deficits. (6) Fixed flexion deformity.

As ground level reverse treadmill walking and incline reverse treadmill walking are not the part of our routine life, so they were given training week day prior to the actual intervention in parallel bars.

Group A - ground level reverse treadmill walking along with SWD and conventional exercises

Group B - incline reverse treadmill walking along with SWD and conventional exercises

Group C - Short wave diathermy and conventional exercises.

Frequency - 27.12 MHz
Wavelength- 11 meters
Positioning method- cross fire method to the knee joint
Intensity of application- as per subjects comfort.
time- 20 minutes/session

Conventional exercises for all three groups include:

- Quadriceps isometric strengthening exercises, High sitting knee extension, Isometric quadriceps with plantar and dorsiflexion, Straight leg raising, Side lying Hip abduction, Prone knee bending, Prone hip extension. All exercises were performed in sets of 10 repetitions with 6 sec hold; 1 set of all exercises once-a-day for 1st week and progressed to 2 sets twice-a-day in 2nd week and 3 sets thrice a day in 3rd week. Treatment session was 15 days.

Pre treatment and post treatment scores were made on the subjects on the first day before intervention and after 15 days of intervention

Result

**Table 1: Comparison of score within group**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>6.87 ± 0.82</td>
<td>3.72 ± 0.56</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>7.39 ± 0.85</td>
<td>3.25 ± 0.59</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (C)</td>
<td>7.08 ± 1.20</td>
<td>3.91 ± 0.58</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

**Table 2: Comparison of VAS score between group**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>6.87 ± 0.82</td>
<td>3.72 ± 0.56</td>
<td>0.2096</td>
<td>Not significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>7.39 ± 0.85</td>
<td>3.25 ± 0.59</td>
<td>0.0028</td>
<td>Very Significant</td>
</tr>
<tr>
<td>Group (C)</td>
<td>7.08 ± 1.20</td>
<td>3.91 ± 0.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Comparison of WOMAC score within group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>70.95 ± 7.70</td>
<td>36.7 ± 4.64</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>74.5 ± 7.64</td>
<td>33.65 ± 6.16</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (C)</td>
<td>67.65 ± 5.68</td>
<td>45.35 ± 3.70</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

Table 4: Comparison of WOMAC score between groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>70.95 ± 7.70</td>
<td>36.7 ± 4.64</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>74.5 ± 7.64</td>
<td>33.65 ± 6.16</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (C)</td>
<td>67.65 ± 5.68</td>
<td>45.35 ± 3.70</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

Table 5: Comparison of SF 36 score within group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>23.56 ± 4.91</td>
<td>59.23 ± 19.45</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>22.12 ± 2.95</td>
<td>74.07 ± 6.68</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (C)</td>
<td>23.69 ± 4.36</td>
<td>44.96 ± 6.99</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

Table 6: Comparison of SF 36 between group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>23.56 ± 4.91</td>
<td>59.23 ± 19.45</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>22.12 ± 2.95</td>
<td>74.07 ± 6.68</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>Group (C)</td>
<td>23.69 ± 4.36</td>
<td>44.96 ± 6.99</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

P Value: 0.6602
Inference: Not significant
Discussion

Osteoarthritis (OA) is a common, chronic, degenerative joint disorder characterized by joint pain, tenderness, limitation of movements, crepitus, occasional effusion, and variable degrees of local inflammation, without systemic manifestations.\(^5,6\)

The aim of this study was to evaluate the effect of ground level reverse treadmill walking versus incline reverse treadmill walking as an adjunct to conventional physiotherapy in chronic osteoarthritis subjects.

The baseline treatment of short wave diathermy and exercises was common for all the groups. Continuous short wave diathermy or a pulsed short wave diathermy were specified as treatments for acute knee osteoarthritis by 34.8% and 73.9% of the respondents, respectively, and for chronic OA by 97.8% and 59.4% of the respondents, respectively. In present study pain reduction, improvement in functional status and exercise tolerance may be due to the major physiological effects of CSWD which are related to an induced increase in tissue temperature, which may induce vasodilatation, elevation of pain threshold, reduction in muscle spasm, acceleration of cellular activity, and increased soft tissue extensibility.\(^{16,17,18}\)

60 patients (34 Males and 26 Females), out of which 36 were Right and 24 were Left side affected, diagnosed as Osteoarthritis Knee. The present study contradicts finding the previous literature that females are more affected than males in OA knee, this may be because of smaller sample size, smaller area of sample collection and specific inclusion criterias.

For pain assessment VAS was used. Within group comparison which was done by paired t test in which group A, B and C the P value was <0.0001 which was extremely significant. In group A the pre mean value was 70.95 and post treatment it decreased to 36.7. In group B, the pre mean value was 74.5 in post treatment it was decreased to 33.65 whereas in group C the pre mean value was 67.65 which was decreased to 45.35. Between group comparison was done using non-parametric Anova in which pre WOMAC was 15.17 which was very significant significant where as post treatment WOMAC was <0.0001 which was extremely significant. These findings supports the literature which states various advantages of retro walking including improvement in muscle activation pattern, reduction in adductor moment at the knee during stance phase of gait and augmented stretch of hamstrings muscle group during the stride.\(^{19}\)

For assesement of quality of life SF-36 was used. Within group comparison which was done by paired t test in which group A, B and C the P value was <0.0001 which was extremely significant. In group A the pre mean value was 23.56 and post treatment it increased to 59.23. In group B, the pre mean value was 22.12 in post treatment it was increased to 74.07 whereas in group C the pre mean value was 23.69 which was increased to 44.96. Between group comparison was done using non-parametric Anova in which pre SF-36 was 0.66 which was not significant where as post treatment SF-36 was <0.0001 which was extremely significant. Possible reasoning for above findings can be walking programs have a positive effect on quality of life in elderly individuals with knee OA. The significant improvement in quality of life may be in relation with physical activity, by helping patients to reduce fatigue and recover their self esteem, motivation and mental health.\(^{20,21}\)

In this study an attempt was made to analyze the effect of ground level reverse treadmill walking versus incline reverse treadmill walking as an adjunct to conventional
physiotherapy in chronic knee osteoarthritis subjects in reducing pain, functional disability improving quality of life in OA Knee patients. Although the result shows extremely significant improvement in all three groups (P<0.0001) group B which included incline reverse treadmill walking along with SWD and conventional exercises showed the maximum improvement by reduced mean values of VAS and WOMAC and increased mean value of SF-36 as compared to group A and C. As Incline walking on a treadmill increases higher firing rate of hamstrings and quadriceps which helps in increasing knee extension moment, increasing strength in functional range and improving physical function as compared to ground level reverse treadmill walking and the control group.15

Conclusion

Incline reverse treadmill walking along with SWD conventional exercises was more effective in decreasing the pain, stiffness and improving quality of life in subjects with chronic knee osteoarthritis as compared to ground level reverse treadmill walking and the control group.

Conflicts of Interest: This study can be carried out with more various forms of exercises, various degree of inclination and large sample size can also be taken into consideration.

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical science, deemed University, Karad.

Source of Funding: Source of funding is Krishna institute of medical sciences deemed University, Karad.

References

4. Ries MD, Philibian EF, Groff GP, Relationship between severity of ganarthrosis and cardiovascular fitness in orthop.1995;313;169:76
5. American Academy Of Orthopedic Surgeons,2004
10. Arata A.W,Kinematic and kinetic Evaluation of High Speed Backward Running university of Oregon microform publication 1999
12. Dr. Falah Salim Manchal, Dr.Abdullah Eiada Mecgeser, Suhad Abdul Hussain. Effectiveness of short wave diathermy and therapeutic ultrasound on the management of knee osteoarthritis.
14. Y.Lufer, G.Dar :effectiveness of thermal and athermal short wave diathermy for the management of knee osteoarthritis; a systemic review and meta analysis
15. Shar A. Alamri , Exercises versus Manual Therapy in Elderly Patients with Knee Osteoarthritis
17. Laurel Charbonneau. The efficacy of short wave diathermy in decreasing knee pain in female with
knee osteoarthritis.

18. Y. Lufer, G. Dar: Effectiveness of thermal and athermal short wave diathermy for the management of knee osteoarthritis; a systemic review and meta-analysis.


Influence of Dietary Solvents on the Strength of Nanofill, Microfill and Minifill Composites

Ayush Razdan Singh¹, Raazia Khan², B Rajkumar³, K K Dixit⁴, Gayathri S Jethwani⁵, Alok Mishra⁶

¹Reader, Department of Conservative Dentistry, Saraswati Dental College, Tiwariganj, Lucknow, U.P., ²P.G.Student, Department of Conservative Dentistry, Saraswati Dental College, Lucknow, U.P., ³Professor and Head, BBD Dental University, Tiwariganj Lucknow, U.P., ⁴Professor, Department of Conservative Dentistry, Institute of Dental Sciences, Pilibhit Bypass Road, Near Suresh Sharma Nagar, Barielly, U.P., ⁵Professor, Conservative Dentistry and Endodontics. Triveni Nagar-II, Sitapur road, Lucknow, U.P., ⁶Professor, Melaka Manipal Medical College, Manipal

Abstract

The search for an ideal restorative material to replace tooth tissue and the demand for products with adhesive and caries protective properties together with a simple procedure for application have led to the development of restorative materials that combine conventional glass Ionomers and light –cure composite resins. It has been demonstrated that composite resins as well as glass ionomers are susceptible to various modes of chemical degradation in vitro; as a result of which the mechanical properties of various composites have been tested after long term storage in solutions. As some polyacid modified composites (compomers) are now indicated for stress –bearing areas, such as posterior and Class IV restorations, the knowledge of how their strength properties are affected by food simulating liquids is important for predicting their clinical performance. The objective of this study was to investigate the effects of food-simulating liquids on the flexural strength of composite and polyacid-modified composite resins. It was seen that the detrimental effects of aqueous solutions on flexural strength appeared to be greater with polyacid modified composite resins than composite restoratives and the latter had significantly higher flexural strength after conditioning in aqueous solutions.

Keywords: Aqueous solutions, compomers, composite, conventional glass ionomers, flexural strength, food simulating liquids, light-cure composite resins, polyacid-modified composite resins.

Introduction

Extensive research has been conducted for an ideal restorative material to replace the tooth tissue.¹ The restorative material should be such that it has adhesive and caries protective properties along with an easy procedure for application. Composite restorative materials consist of a continuous polymeric or resin matrix in which an inorganic filler is dispersed. This inorganic filler phase significantly enhances the physical properties of the composite.² These materials are used in almost all types and sizes of restorations, are accomplished with minimum loss of tooth structure, little or no discomfort, relatively short operating time and a moderate expense to the patient.³ Thus they are an ideal esthetic material for restoring teeth. Materials have been developed that combine conventional glass ionomers and light cure composite resin. A polyacid modified composite resin (compomer) contains either or both of the essential components of a resin modified glass ionomer cement.

Method

Three composite (Z 250, Alpha dent and Esthet X) and one polyacid modified composite restorative (Dyract) were selected for this study. Flexural strength testing specimens of the restoratives were fabricated according to ISO 4049 specifications (35mm lengthx2mm...
widthx2mm height) in customized steel molds and each increment of this restorative placed in the mould polymerized for 40 seconds. 25 specimens were made for each material. They were randomly divided into five groups of five and conditioned for one week at 37°C.

Group 1-Air (control)

Group 2-Distilled water

Group 3-0.02 M Citric Acid

Group 4-Heptane

Group 5-50% Ethanol water solution

At the end of the conditioning period, the flexural strength of the restoratives was assessed in an Instron Universal Testing Machine at a crosshead speed of 0.05 mm/minute until the specimens fractured. The maximum load exerted on the specimens was recorded and the flexural strength calculated in Megapascals. Using ANOVA and Tukey tests the flexural strength of the materials was statistically tested to study the effect of the food simulating liquids.

Statistics

ANOVA reveals statistically significant differences in flexure strength among groups for conditioning in medium Heptane, air, Citric acid and Ethanol water. Statistically no significant differences were seen among groups for deionized water. Statistically a significant difference is seen between Ceram-X and Alpha Dent composite. Statistically a significant difference is seen between Ceram-X and Esthet-X and Ceram-X and Alpha Dent Composite. Statistically no significant difference is seen between Ceram-X and Esthet-X but the difference between Ceram-X and Alpha Dent and Esthet-X and Alpha Dent is significant. Statistically no significant difference is seen between Alpha Dent and Esthet-X and Esthet-X but the difference between Ceram-X and Alpha Dent is significant. Overall the mean flexure strength for different material was as follows: Alpha Dent>Esthet X>Ceram X

TABLE 1: Flexural strength (MPa) difference in individual medium

<table>
<thead>
<tr>
<th>Liquid</th>
<th>Ceram X</th>
<th>Esthet X Composite</th>
<th>Alpha dent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heptane</td>
<td>9.6094</td>
<td>9.8438</td>
<td>11.9063</td>
</tr>
<tr>
<td>0.02M Citric Acid</td>
<td>9.1406</td>
<td>9.1406</td>
<td>11.0156</td>
</tr>
<tr>
<td>Deionised water</td>
<td>7.9688</td>
<td>7.6875</td>
<td>9.1406</td>
</tr>
<tr>
<td>50% Ethanol</td>
<td>5.3906</td>
<td>6.5625</td>
<td>7.0313</td>
</tr>
<tr>
<td>Control (Air)</td>
<td>7.9688</td>
<td>10.0781</td>
<td>10.3125</td>
</tr>
</tbody>
</table>
Flexural strength (MPa) different in individual medium
- Maximum Flexural Strength – Heptane, Alpha dent
- Minimum Flexural Strength – 50% Ethanol, Ceram X

**TABLE 2: Intergroup comparison for breaking load in medium Heptane**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>‘t’</th>
<th>‘p’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceram X vs. Esthet X</td>
<td>0.316</td>
<td>0.760</td>
</tr>
<tr>
<td>Ceram X vs. Alpha dent</td>
<td>2.561</td>
<td>0.034</td>
</tr>
<tr>
<td>Esthet X vs. Alpha dent</td>
<td>2.475</td>
<td>0.038</td>
</tr>
</tbody>
</table>

**TABLE 3: Intergroup comparison for breaking load in medium Air**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>‘t’</th>
<th>‘p’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceram X vs. Esthet X</td>
<td>2.846</td>
<td>0.022</td>
</tr>
<tr>
<td>Ceram X vs. Alpha dent</td>
<td>2.887</td>
<td>0.020</td>
</tr>
<tr>
<td>Esthet X vs. Alpha dent</td>
<td>0.258</td>
<td>0.803</td>
</tr>
</tbody>
</table>

**TABLE 4: Intergroup comparison for breaking load in medium Citric Acid**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>‘t’</th>
<th>‘p’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceram X vs. Esthet X</td>
<td>0.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Ceram X vs. Alpha dent</td>
<td>2.794</td>
<td>0.023</td>
</tr>
<tr>
<td>Esthet X vs. Alpha dent</td>
<td>2.530</td>
<td>0.035</td>
</tr>
</tbody>
</table>

**TABLE 5: Intergroup comparison for breaking load in medium Deionized water**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>‘t’</th>
<th>‘p’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceram X vs. Esthet X</td>
<td>0.535</td>
<td>0.608</td>
</tr>
<tr>
<td>Ceram X vs. Alpha dent</td>
<td>1.890</td>
<td>0.095</td>
</tr>
<tr>
<td>Esthet X vs. Alpha dent</td>
<td>2.762</td>
<td>0.025</td>
</tr>
</tbody>
</table>

**TABLE 6: Intergroup comparison for breaking load in medium Ethanol water**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>‘t’</th>
<th>‘p’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceram X vs. Esthet X</td>
<td>2.132</td>
<td>0.066</td>
</tr>
<tr>
<td>Ceram X vs. Alpha dent</td>
<td>2.746</td>
<td>0.025</td>
</tr>
<tr>
<td>Esthet X vs. Alpha dent</td>
<td>1.000</td>
<td>0.347</td>
</tr>
</tbody>
</table>

Overall Alpha dent > Esthet X > Ceram X

**TABLE 7: Comparison of Flexure Strength in different media**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Mean</th>
<th>N</th>
<th>Std.deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heptane</td>
<td>10.4531</td>
<td>15</td>
<td>1.6136</td>
</tr>
<tr>
<td>Air</td>
<td>9.4531</td>
<td>15</td>
<td>1.6253</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>9.7656</td>
<td>15</td>
<td>1.3248</td>
</tr>
<tr>
<td>Deionised water</td>
<td>8.2656</td>
<td>15</td>
<td>1.0462</td>
</tr>
<tr>
<td>50% Ethanol</td>
<td>6.3281</td>
<td>15</td>
<td>1.0667</td>
</tr>
</tbody>
</table>

Heptane > Citric acid > Air > Deionised water > 50% Ethanol

**TABLE 8: Inter group comparision**

<table>
<thead>
<tr>
<th>Comparison</th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heptane-Air</td>
<td>1.845</td>
<td>14</td>
<td>.086</td>
</tr>
<tr>
<td>Heptane-Citric acid</td>
<td>1.511</td>
<td>14</td>
<td>.153</td>
</tr>
<tr>
<td>Heptane-Deionized water</td>
<td>5.479</td>
<td>14</td>
<td>.000</td>
</tr>
<tr>
<td>Heptane-50%Ethanol</td>
<td>9.135</td>
<td>14</td>
<td>.000</td>
</tr>
<tr>
<td>Air-Citric acid</td>
<td>.631</td>
<td>14</td>
<td>.538</td>
</tr>
<tr>
<td>Air-Deionized water</td>
<td>2.414</td>
<td>14</td>
<td>.030</td>
</tr>
<tr>
<td>Air-50%Ethanol</td>
<td>10.583</td>
<td>14</td>
<td>.000</td>
</tr>
<tr>
<td>Citric acid-Deionized water</td>
<td>3.993</td>
<td>14</td>
<td>.001</td>
</tr>
<tr>
<td>Citric acid-50%Ethanol</td>
<td>9.832</td>
<td>14</td>
<td>.000</td>
</tr>
<tr>
<td>Deionized water-50%Ethanol</td>
<td>5.229</td>
<td>14</td>
<td>.000</td>
</tr>
</tbody>
</table>
Results

Irrespective of the material used the flexural strength was maximum in the samples aged in Heptane and minimum in samples aged in 50% ethanol water solution. Irrespective of the medium used Alpha Dent showed the maximum flexural strength whereas Ceram X showed the minimum.

There is no significant difference between the three groups for heptane, deionozed water and citric acid. Values are least for 50% ethanol among all the solutions.

Discussion

The food simulating liquids used for conditioning the restoratives in this investigation are among those recommended in the FDA guidelines to be used as food simulators. Heptane simulates butter, fatty meats and vegetable oils. The ethanol-water solution and citric acid simulate beverages, including alcohol, vegetables, fruits, sweets and syrup. Deionised water is included to simulate the wet intraoral environment provided by saliva and water. For all the restoratives evaluated, the highest value of flexural strength was observed after conditioning in heptane as compared to conditioning in other aqueous mediums. Conditioning in heptane also resulted in significantly higher flexural strength values than the control.

The reason is:-

1. Heptane reduces oxygen inhibition during post curing that occurs for the specimens conditioned in air (control). Heptane eliminates leaching out of silica and combined metals in fillers which may occur from conditioning in aqueous solutions.

2. In other aqueous solutions -when the different resin –bonded fillers are immersed in aqueous solutions the resin matrices swell and resulting tensile stresses strain the Si double bonds in the fillers making them more susceptible to stress and corrosion attacks. Complete or partial filler debonding occurs due to stress corrosion at the surface layer of fillers and this degradation of the filler-matrix interface results in decrease in flexural strength and other physical properties.

3. 50% Ethanol Water Solution -for all the restoratives tested conditioning in 50% ethanol-water solution resulted in the lowest flexural strength. The reason for this is that the resin matrices of the various restoratives are based either on BISGMA (Bisphenol A glycidyl methacrylate) or UDMA (Urethane dimethacrylate) which have a solubility parameter of 50%, similar to aqueous solution of ethanol water. The extent of damage depends upon the diffusion rate and molecular weight of the penetrant. The damage mechanism is attributed
to the softening of the polymer matrix by ethanol water solution resulting in partial removal at the surface. This results in “prouding” of the filler particles which serve as areas of stress concentration during flexural strength testing.\textsuperscript{9} Dyract-AP is based on a UDMA resin and the maximum softening of this resin results from exposure to 50% ethanol water solution. This is the reason for a significant statistical difference in control and restoratives conditioned in ethanol-water in case of DyractAP. Lower flexural strength values of compomers may be due to uptake of water which is necessary for activation of acidbase reaction in the polymer matrix.

**Conclusions**

The flexural strength of composites was significantly higher than their polyacid modified counterpart in all the mediums tested. Detrimental effect of aqueous solutions was more with compomers than composite. Compomers should be used in stress bearing areas with caution. The highest flexural strength was obtained when the restoratives were aged in heptanes. The lowest flexural strength was obtained when the restoratives were aged in ethanol-water. Esthet-X was the best material as far as flexure strength was concerned.

**Ethical Clearance** - Taken from Ethical committee of Saraswati dental college

**Source of Funding** - Self

**Conflict of Interest** – None

**References**

A Study of Factors affecting Online Shopping in Chennai

V. Andal¹, G. Mythili²

¹Associate Professor, VISTAS, Pallavaram, Chennai, ²Assistant Professor, Vels Institute of Science, Technology & Advanced Studies, Chennai

Abstract

Online retailing has shown enormous growth in India in recent years. However as compared to the other countries which are leading in online retailing, India is still in its initial stage of development. The purpose of this study was to explore the factors that affect online shopping in Chennai. The sampling method used is Random sampling to select a sample of 80. Percentage analysis, Chi-square test for finding out the association between variables and Correlation Co-efficient for finding out the relationship between the factors affecting online purchase behaviour and consumers’ attitude towards online shopping.

Keywords: Online retailing, Consumers’ attitude, Convenient sampling.

Introduction

Online shopping is a new form of electronic commerce by which consumers can directly buy goods or services from a seller over the internet using the web browser. Consumers find a product of their interest by visiting the website of the retailer directly or by searching among alternative vendors using a shopping search engine which displays the same product’s availability and pricing at different retailers.

An online shop evokes the physical analogy of buying products or services at a regular process are called business-to-consumer (B2C) online shopping. When an online store is being set up to enable businesses to buy from another business, the process is called business-to-business (B2B) online shopping. An online store enables the customer to browse a company’s range of products and services, view images of the products and also they can view information about the product specifications, features and prices. And also they can read the reviews of consumers about the products.

Literature Review

Zuroni Md Jusoh et al.¹ (2012) in their study on “factors influencing consumers’ attitude towards e-commerce purchases through online shopping”, used Convenience sampling to collect 100 responses in Taman Tawasi, Ipoh. Pearson’s correlation revealed that there was a significant relationship between e-commerce experience, product perception, customers’ service and attitude towards online shopping among the respondents. It was found out from the study that there was no significant relationship between consumers’ risk and attitude towards online shopping among the respondents.

Hana Uzun et al.² (2014), made a research on “Factors Affecting Online Shopping Behaviour of Consumers”. Data gathering was carried out by the survey from 200 randomly selected citizens, from which 104 responded. The results of this study revealed that there is a relation between customers’ satisfaction with online service and consumers’intention to buy in the future which generates customer loyalty.

V.P.T Dhevika et al.³ (2014) analysed on “factors influencing online buying behaviour in Thiruchirapalli district”. Convenient sampling method was used and responses were collected from 100 people. Collected data were analyzed using tools like percentage analysis, chi square test, one way ANOVA and ‘t’ test and they revealed that the most important factor influencing online shopping was Security followed by Trust worthy shopping and Website design/ features and the least important factors influencing overall online shopping was bargaining.
Yi Jin Lim et al. (2015) studied on “Factors Influencing Online Shopping Behaviour: The Mediating Role of Purchase Intention”, University students aged between 18 and 34 pursuing their studies in University Malaysia Perlis were selected as the subject of analysis. Totally 662 out of 800 sets of questionnaires distributed turned out to be valid for coding, analyzing and testing the hypothesis. They concluded that subjective norm and perceived usefulness positively influence online purchase intention but subjective norm insignificant influence shopping behaviour in a negative way.

R. Ganapathy (2015) conducted “A study on factors affecting online shopping behavior of consumers in Chennai”. In his study, he found out that convenience, website features, security and time saving were the factors that affected online shopping behaviour of consumers by using exploratory factor analysis. The regression analysis indicated that convenience, security, website features and time saving were positively and significantly influencing the purchasing decision of consumers at one per cent level.

Rajyalakshmi Nittala (2015) studied on “Factors Influencing Online Shopping Behavior of Urban Consumers in India”. Factor analysis and multiple regression analysis were used and identified that perceived risk and price positively influenced online shopping behavior. Results revealed that positive attitude, product risk and financial risk were the factors which affected negatively the online shopping behavior.

Objective of the Study

1. To study the factors influencing online buying behaviour.

2. To identify the association between demographic profile and online buying behaviour.

3. To find out the relationship between the factors affecting online purchase behaviour and consumers’ attitude towards online shopping.

Research Methodology

The Chennai city has been purposively selected for the study. The questionnaires were distributed to 100 people selected by using random sampling technique in Chennai city and 80 questionnaires turned out to be fit for analysis. The data information pertains to the year 2018. Chi-square test & Correlation coefficient were used by the researcher for analysis of primary data.

DATA ANALYSIS AND INTERPRETATION

<table>
<thead>
<tr>
<th>Table - 1: Products purchased online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Products</td>
</tr>
<tr>
<td>Art products</td>
</tr>
<tr>
<td>Books</td>
</tr>
<tr>
<td>Clothing</td>
</tr>
<tr>
<td>Computer Accessories</td>
</tr>
<tr>
<td>Cosmetics</td>
</tr>
<tr>
<td>Electronic goods</td>
</tr>
<tr>
<td>Entertainment</td>
</tr>
<tr>
<td>Gift</td>
</tr>
<tr>
<td>Jewellery Accessories</td>
</tr>
<tr>
<td>Music &amp; Videos</td>
</tr>
<tr>
<td>Real Estate</td>
</tr>
<tr>
<td>Sports Articles</td>
</tr>
<tr>
<td>Travel &amp; Vacations</td>
</tr>
<tr>
<td>Footwear</td>
</tr>
</tbody>
</table>

Source: Primary Data

The above table shows that the respondents prefer to buy more electronic products through online (42.50%), The next preferred online product is Books (33.80%) and the third in the list is clothing (30%). The next in the preferred shopping by respondents are computer accessories (26.30%), Cosmetics (16.30%) and Real estate (2.50%) are the least preferred online shopping product.

Chi-Square Test:

The Chi-Square test of independence is used to determine if there exists significant association between variables. The chi-square test of independence can be used to examine this association. The null hypothesis for this test is that there is no relationship between the variables. The alternate hypothesis is that there exists a relationship between variables.
Table - 2 : Chi – square between Occupation & Buying Behaviour

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp.sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>48.987(a)</td>
<td>4</td>
<td>.000</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>5.660</td>
<td>4</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear association</td>
<td>2.359</td>
<td>1</td>
<td>.125</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) 6 cells (60.0%) have expected count less than 5. The minimum expected count is .18.

Source: Compiled from output of SPSS from Primary Data

The above table shows that there is a strong association between occupation and buying behaviour of the respondents. (Chi-square = 48.987, df=4, p = .000).

Table - 3 : Chi – square between Income & Price

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp.sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>5.757(a)</td>
<td>3</td>
<td>.124</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>5.660</td>
<td>3</td>
<td>.129</td>
</tr>
<tr>
<td>Linear-by-Linear association</td>
<td>3.657</td>
<td>1</td>
<td>.056</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a.2 cells (25.0%) have expected count less than 5. The minimum expected count is 2.40.

Source: Compiled from output of SPSS from Primary Data

The above table shows that there is no association between income of the respondents and price of the product. (Chi-square = 5.757, df=3, p = .124).

Table - 4: Chi – square between Age & Quality of Website

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp.sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>10.488(a)</td>
<td>4</td>
<td>.033</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>11.301</td>
<td>4</td>
<td>.023</td>
</tr>
<tr>
<td>Linear-by-Linear association</td>
<td>.419</td>
<td>1</td>
<td>.518</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a.4 cells (40.0%) have expected count less than 5. The minimum expected count is 49.

Source: Compiled from output of SPSS from Primary Data

The table shows that there is an association between age of the respondents and quality of the website. (Chi-square = 10.488, df=4, p = .033).
Table - 5: Chi-Square between Gender & Convenience

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp.sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>1.257(b)</td>
<td>1</td>
<td>.262</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>1.260</td>
<td>1</td>
<td>.262</td>
</tr>
<tr>
<td>Linear-by-Linear association</td>
<td>1.241</td>
<td>1</td>
<td>.265</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.50.

Source: Compiled from output of SPSS from Primary Data

The above table shows that there is no association between Gender of the respondents and convenience of shopping. (Chi-square = 1.257, df=1, p = .262).

Correlation: The correlation coefficient is a statistical measure that calculates the strength of the relationship between the relative movements of the two variables. In this study, Correlation Co-efficient has been used to find out the relationship between the factors affecting online purchase behaviour and consumers’ attitude towards online shopping.

Table - 6: Correlation of factors affecting online purchase

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online buying behaviour</td>
<td>.302**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web Presentation</td>
<td>.326**</td>
<td>.363**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price</td>
<td>.223**</td>
<td>.620**</td>
<td>.363**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Convenience</td>
<td>.253**</td>
<td>.221**</td>
<td>.207**</td>
<td>.335**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product features</td>
<td>.388**</td>
<td>.236**</td>
<td>.294**</td>
<td>.263**</td>
<td>.419**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of the website</td>
<td>.883**</td>
<td>.557**</td>
<td>.680**</td>
<td>.620**</td>
<td>.649**</td>
<td>.296**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of finding product</td>
<td>.717**</td>
<td>.660**</td>
<td>.224**</td>
<td>.263**</td>
<td>.465**</td>
<td>.261**</td>
<td>.572**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment method</td>
<td>.759**</td>
<td>.218**</td>
<td>.716**</td>
<td>.236**</td>
<td>.598**</td>
<td>.338**</td>
<td>.338**</td>
<td>.224**</td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

Source: Compiled from output of SPSS from primary data

The above table indicates Pearson’s correlation among the product satisfaction and the factors that affect online purchase. There is a high positive correlation between Product satisfaction and quality of the website. The correlation among product satisfaction and 8 factors affecting online purchase such as Online buying behaviour, web presentation, price, convenience, product features, quality of the website, ease of finding
product and payment method were positively significant at 1% level. Hierarchically, product satisfaction has the high positive correlation with quality of the website \((r=0.883, p<.01)\) followed by payment method \((r=0.759, p<.01)\).

Online buying behaviour has the high positive correlation with ease of finding the product \((r=0.660, p<.01)\) followed by price of the product \((r=0.620, p<.01)\). Web presentation has high positive correlation with payment method \((r=0.716, p<.01)\). Price has high correlation with quality of the website \((r=0.680, p<.01)\) followed by convenience \((r=0.335, p<.01)\).

Convenience has high positive correlation with quality of the website \((r=0.649, p<.01)\) followed by payment method \((r=0.598, p<.01)\). Product features has high positive correlation with payment method \((r=0.338, p<.01)\) followed by quality of the website \((r=0.296, p<.01)\). Quality of the website has high positive correlation with ease of finding the product \((r=0.338, p<.01)\).

**Findings**

1. The percentage analysis reveals that the electronic goods are the most preferred product to shop online and Real estate is the least preferred product.

2. The percentage analysis also shows that the most influencing factor that influences online purchase is the ease of finding the product online.

3. The Chi-square test reveals that there is a strong association between occupation and buying behaviour of the respondents.

4. The Chi-square test also reveals that there is no association between income of the respondents and price of the product.

5. There is an association between age of the respondents and quality of the website as shown by the Chi-square test statistic.

6. Chi-square test shows that there is no association between Gender of the respondents and convenience of shopping.

7. Pearson’s Correlation co-efficient shows that the product satisfaction has the high positive correlation with quality of the website. Online buying behaviour has the high positive correlation with ease of finding the product.

**Conclusion**

Online shopping is at a increasing pace. Right from school students to office goers, everyone is aware of online shopping. Especially females do a lot of online shopping than male members. The people look at the quality of the website for shopping and also they look into ease with which the products which they search online are available. Even though there are many positive aspects towards online shopping, still many people are afraid of providing their credit card or debit card information for payment through online and go in for cash on delivery mode. The security system can be improved and awareness can be created among public about the security systems available on online shopping.

**Ethical Clearance** – Taken from NIL Committee

**Source of Funding** – Self

**Conflict of Interest** - Nil

**References**


Perceived Benefits & Risks of Online Grocery Shopping: 
Role of Cognitive Influences

Sneha Ghai¹, Somya Tripathi²

¹Assistant Professor, Amity Institute of Organic Agriculture, Amity University, Uttar Pradesh, India,  
²Student, Melbourne Business School, University of Melbourne, Victoria, Australia

Abstract

Background: Lifestyle and work life in present scenario demands and sees an increased usage of internet for grocery purchase. This paper discusses the perceived role of benefits and risks of shopping grocery online. It also aims to explore the consumer’s purchase behaviour intention and its influence on attitude-behaviour towards online grocery shopping (OGS). Objectives: To determine the relationship between the perceived values like convenience, past experience / perceived risks of OGS and purchase intention. Secondly to explore how these benefits and risk vary amongst the working and non-working class of the respondents. Method: Descriptive study using a pre-tested and structured questionnaire was carried out on 200 respondents across Delhi-NCR out of which 100 were working and 100 were non-working. Data was analyzed using Descriptive statistics, Correlation Technique and Multivariate Linear Regression analysis. Results: The results showed differences in opinion of consumers which are strongly influenced by convenience, ease of purchase and past experience and economic benefits. Conclusion: Differences were observed amongst working & non-working in perception of barriers associated including inability to physically examine the product, difficulty in returning products and high delivery charge and time and lack of social contact with other shoppers. The paper provides an empirical insight about how the e-retailers and advertisers can cater to the needs of consumers of online grocery within different segments.

Keywords: purchase intention, online grocery shopping (OGS), perceived benefits, perceived risks, correlation and regression

Introduction

Food & Grocery are the basic life requirement and while luxuries like restaurants, vacations, etc. may take a backseat., Groceries do sell irrespective of the economic condition of the country. Facing a fierce competition from mom & pop stores and hyper local options available already, condition of online grocery market is still improving. Although popular, shopping for groceries online is arguably a discontinuous innovation¹. Consumers are influenced by habits and deeply rooted traditional behavior when shopping for groceries². Consumer behavior is determined by intention which, in turn, is influenced by consumer attitude towards OGS³. There are perceived values of online grocery shopping like Convenience, Variety, Quality, etc., and also perceived barriers like inability to examine the product physically, lack of social contact, payment issues etc. Convenience is related to forms of non-monetary costs like stress, effort, time and psychological cost⁴. OGS offers consumers a greater convenience as they can shop anytime from anywhere, thus saving time from trips to physical stores. Variety is an important incentive in terms of product type and brand⁵. Quality has a direct impact on the consumer behavioral intentions towards OGS⁶. Also, individuals prefer to purchase online more as it provides better prices & deals⁷,⁸. Results reveals that previous online shopping experiences influences the consumer attitude towards online shopping and intention to shop online⁹,¹⁰. This fact is supported by a study that consumers’ preference towards an e-grocery store might be positively influenced by easiness to order groceries¹¹. Psychological barriers of consumer resistance were stated to be reasons for low adoption in the case of e-commerce services¹². Other hindering factors are the substitutability of the web environment to personally examining products and lack of feeling the tangible goods¹³,¹⁴,¹⁵. Also, security issues and privacy factors during final payment transactions become much of the concern for the consumers¹⁶,¹⁷. Shopping at stores is
often treated as a chance for spending time with friends/family members and also enjoy the social activities which lacks on an online platform\textsuperscript{[18, 19&20]}. A majority of the consumers hate to pay premium in the form of delivery fee for everyday necessity products like groceries\textsuperscript{[21, 22]}. Consumers face difficulty while trying to return a product they purchased online, especially in the online grocery industry. This is why online stores are perceived to have competitive disadvantages with respect to Is “for return” required after exchange/refund policy? as compared to in-store shopping\textsuperscript{[23]}. Having no guarantee about getting what they ordered is a major barrier\textsuperscript{[23]}. Inconvenient & longer delivery times and methods are major reasons cited by consumers who do not purchase groceries online\textsuperscript{[7&15]}.

Materials and Method
A descriptive study was carried out in Delhi-NCR using quota sampling to see the contrasting difference in the attitude, intention and current behaviour of both working and non-working consumers. Questionnaires were filled by 200 respondents, 100 working and 100 non-working, out of which only 160 were found to be valid for study, 80 working and 80 non-working. The data was analysed by using (SPSS). Regression and correlation analyses was employed to find the significant relationship between the perceived benefits & risks and the purchase intention for grocery online.

CONCEPTUAL FRAMEWORK

Table 1 : Socio-Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working</td>
<td>Non-working</td>
</tr>
<tr>
<td>Age</td>
<td>18-25</td>
<td>20.5</td>
</tr>
<tr>
<td></td>
<td>25-35</td>
<td>36.1</td>
</tr>
<tr>
<td></td>
<td>35-45</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>45-55</td>
<td>19.3</td>
</tr>
<tr>
<td></td>
<td>55+</td>
<td>7.2</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>39.8</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>60.2</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Single</td>
<td>36.1</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>63.9</td>
</tr>
<tr>
<td>Family Size</td>
<td>Nuclear Family</td>
<td>44.6</td>
</tr>
<tr>
<td></td>
<td>Family with 2 or more children</td>
<td>42.2</td>
</tr>
<tr>
<td></td>
<td>Joint Family</td>
<td>13.3</td>
</tr>
<tr>
<td>Monthly Income</td>
<td>10,000-20,000</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>20,000-30,000</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>30,000-40,000</td>
<td>28.9</td>
</tr>
<tr>
<td></td>
<td>40,000-50,000</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>50,000+</td>
<td>39.8</td>
</tr>
<tr>
<td>Education</td>
<td>Senior Secondary School</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>High School</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>48.2</td>
</tr>
<tr>
<td></td>
<td>Post Graduate</td>
<td>49.4</td>
</tr>
</tbody>
</table>

Source – Primary data SPSS
Measurement of Attitude towards Online Grocery Purchase

Current vs Previous Online Grocery Purchase:

It’s found that out of 49.4% of working population that has previously purchased groceries online, only 42.2% still do, and out of 46.3% of non-working population that has previously purchased groceries online, only 31.3% of still continue to purchase groceries online. This indicates a drop in online grocery purchase for both working and non-working population, though it’s more in the case of non-working population.

Usual place of grocery purchase:

“Local Kirana” (54.2%) is found to be the most popular place for grocery shopping for the working population, followed by “Supermarkets” (42.2%), and for non-working population indulging in online grocery shopping “Supermarket” (38%) is the most popular place.

Current Online Purchase Frequency:

Results indicate that out of the 42.2% working and 31.3% non-working population currently purchasing grocery online, most people purchase groceries online “Once in a month”, i.e., 16.77% working and 13.77% non-working population, respectively.

In comparison, though percentage of non-working population engaging in online grocery purchase is less, their purchase frequency is higher, with only a very small percentage purchasing grocery online rarely.

Preference for online grocery purchase:

Results indicated that out of 57.830% working population that currently doesn’t purchase grocery online, if given a chance, 12.048% would definitely like to, 38.554% might like to and 7.228% would definitely not like to opt for online grocery purchase.

Also, out of 68.70% non-working population that currently doesn’t purchase grocery online, if given a chance, 15% would definitely like to, 38.7% might like to and 15% would definitely not like to opt for online grocery purchase.

Perceived Value of Online Grocery Purchase:

Perception of Online Grocery Purchase to be beneficial:

Results indicated that 81.3% of the working and 69.1% of the non-working population believe OGS to be beneficial.

Results of both, preference for and perceived benefits of OGS, indicated a highly positive attitude towards online grocery purchase by the working and a moderately positive one by non-working respondents, despite the drop in online grocery purchase as depicted by current behavior. Thus, it’s vital for online retailers to understand the perceived behavioral control by analyzing the factors facilitating and inhibiting the online purchase of groceries for both working and non-working population, respectively.

Reliability:

The reliability and consistency of each item is measured with Cronbach’s alpha and interpreted as satisfactory for all the items as the Cronbach’s Alpha is 0.784.

Hypothesis Testing:

Developed on the basis of literature review, all the hypotheses are tested using the Pearson Correlation with a p-value of less than 0.05. Also, higher the ‘r’ value, stronger the relationship.

H1: Consumer intention to purchase groceries online is influenced by their perception of online grocery purchase as convenient.

A moderately strong positive relationship between consumer Online Grocery Purchase Intention and their perception of OGS as convenient (r=0.466, p=.000) at 0.01 significance level is found as p-value is less than 0.05. Hence, hypotheses (H1) should be accepted.

H2: Consumer intention to purchase groceries online is influenced by their perception that online grocery purchase provides variety.

No significant relationship between consumer Online Grocery Purchase Intention and their perception that Online Grocery Purchase provides variety is found (r=0.145, p=.063) at 0.01 significance level. Hence, hypotheses (H2) should be rejected.

H3: Consumer intention to purchase groceries online is influenced by their perception that online grocery purchase provides quality.
A moderately strong positive relationship between Online Grocery Purchase Intention and their perception that OGS provides quality products \((r=0.369, p=.000)\) at 0.01 significance level is found. Hence, hypotheses (H3) should be accepted.

H4: Consumer intention to purchase groceries online is influenced by their perception of online grocery purchase as economical.

A moderately strong positive relationship between consumer Online Grocery Purchase Intention and their perception that OGS is economical is found \((r=0.369, p=.000)\) at 0.01 significance level. Hence, hypotheses (H4) should be accepted.

H5: Consumer intention to purchase groceries online is influenced by their past experience of online grocery purchase.

A moderately strong positive relationship between consumer Online Grocery Purchase Intention and their past experience of OGS \((r=0.373, p=.000)\) at 0.01 significance level is found. Hence, hypotheses (H5) should be accepted.

H6: Consumer intention to purchase groceries online is influenced by their perception of ease of online grocery purchase.

The results indicate a moderately strong positive relationship between consumer Online Grocery Purchase Intention and their perception that online grocery is easy to purchase \((r=0.453, p=.000)\) at 0.01 significance level. Hence, hypotheses H6 should be accepted.

**Multivariate Linear Regression Analysis:**

**Perceived Values of Online Grocery Purchase:**

Results of regression for motives significantly influencing the online grocery purchase intention as summarized below in Table no. 2 & 3, for the working population indicated that Perceived Convenience and Perceived Ease of Purchase have significant standardized regression coefficients \((p\text{-value }=0.034\text{ and }0.01)\) respectively, although the latter \((\text{Beta}=0.356)\) has greater effect than the former \((\text{Beta}=0.204)\) on intention to purchase grocery online.

Results for the non-working population indicated that Perceived Convenience and Prior Purchase Experience have significant standardized regression coefficients \((p\text{-value }=0.024\text{ and }0.49)\) respectively, although Perceived Convenience \((\text{Beta}=0.284)\) has a larger effect than Prior Purchase Experience \((\text{Beta}=0.219)\) on intention to purchase grocery online.

<table>
<thead>
<tr>
<th>Model</th>
<th>Working Beta</th>
<th>Non-Working Beta</th>
<th>Working T</th>
<th>Non-Working T</th>
<th>Working Sig.</th>
<th>Non-Working Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>.204</td>
<td>.284</td>
<td>.204</td>
<td>1.344</td>
<td>.239</td>
<td>.183</td>
</tr>
<tr>
<td>Perceived Convenience</td>
<td>.018</td>
<td>-.109</td>
<td>.018</td>
<td>1.596</td>
<td>.815</td>
<td>.336</td>
</tr>
<tr>
<td>Perceived Quality</td>
<td>.218</td>
<td>.054</td>
<td>.356</td>
<td>.511</td>
<td>.118</td>
<td>.611</td>
</tr>
<tr>
<td>Perceived Economy</td>
<td>.356</td>
<td>.149</td>
<td>.094</td>
<td>1.277</td>
<td>.001</td>
<td>.206</td>
</tr>
<tr>
<td>Prior Experience</td>
<td>.094</td>
<td>.219</td>
<td>.204</td>
<td>2.000</td>
<td>.395</td>
<td>.049</td>
</tr>
</tbody>
</table>
Table 3: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>25.954</td>
<td>6</td>
<td>4.326</td>
<td>8.325</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>37.933</td>
<td>73</td>
<td>.520</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>63.887</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>23.658</td>
<td>6</td>
<td>3.943</td>
<td>6.545</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>43.380</td>
<td>72</td>
<td>.602</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>67.038</td>
<td>78</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dependent Variable: Intention to Purchase Grocery Online

Predictors: (Constant), Perceived Convenience, Perceived Variety, Perceived Quality, Perceived Economy, Perceived Ease of Purchase, Prior Experience.

Source – SPSS Data Results, Compiled by Authors

Perceived Barriers/Risks to Online Grocery Purchase:

Results of regression for barriers to OGS which significantly inhibit the online grocery purchase intention, as summarized below in Table 4& 5, indicated that Inability to Physically Examine the Product and Difficulty in Returning Products have significant standardized regression coefficients (p-value =0.31 and 0.40), and the former (Beta=2.201) has a larger effect than the latter (Beta=1.989) on working population’s intention to purchase grocery online. Meanwhile, for the non-working population, Inability to Physically Examine Product, High Delivery Charge and Time, and Lack of Social Contact with Other Shoppers have significant standardized regression coefficients (p-value =0.003, 0.35 and 0.20), and Lack of Inability to Physically Examine the Product (Beta=0.380) has a larger effect than lack of social contact (Beta=0.256) on Non-Working population’s intention to purchase grocery online.

Table 4: COEFFICIENTS

<table>
<thead>
<tr>
<th>Model</th>
<th>Beta</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Working</td>
<td>Non-Working</td>
<td>Working</td>
<td>Non-Working</td>
</tr>
<tr>
<td>(Constant)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Inability to Physically Examine and Evaluate the Product</td>
<td>.278</td>
<td>.380</td>
<td>9.630</td>
<td>6.008</td>
</tr>
<tr>
<td>High Delivery Charge and Time</td>
<td>.231</td>
<td>-.262</td>
<td>2.201</td>
<td>3.057</td>
</tr>
<tr>
<td>Unsuitable Delivery Hours</td>
<td>.086</td>
<td>.053</td>
<td>.617</td>
<td>.431</td>
</tr>
<tr>
<td>Lack of social contact with other shoppers</td>
<td>.101</td>
<td>.256</td>
<td>.925</td>
<td>2.389</td>
</tr>
<tr>
<td>Difficulty in returning products</td>
<td>.258</td>
<td>-.100</td>
<td>1.989</td>
<td>-.796</td>
</tr>
<tr>
<td>Forgery or Defective Product</td>
<td>.129</td>
<td>.138</td>
<td>.794</td>
<td>1.315</td>
</tr>
<tr>
<td>High Product Price</td>
<td>.047</td>
<td>.089</td>
<td>.342</td>
<td>.707</td>
</tr>
<tr>
<td>No Guarantee</td>
<td>.233</td>
<td>.014</td>
<td>1.875</td>
<td>.119</td>
</tr>
<tr>
<td>Security Issues regarding Online Payment</td>
<td>.223</td>
<td>.068</td>
<td>1.731</td>
<td>.468</td>
</tr>
</tbody>
</table>
Table 5: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>12.864</td>
<td>9</td>
<td>1.429</td>
<td>2.073</td>
<td>.043b</td>
</tr>
<tr>
<td>Residual</td>
<td>49.636</td>
<td>72</td>
<td>.689</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>62.500</td>
<td>81</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td>18.112</td>
<td>9</td>
<td>2.012</td>
<td>2.870</td>
<td>.006b</td>
</tr>
<tr>
<td>Residual</td>
<td>49.088</td>
<td>70</td>
<td>.701</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>67.200</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>79</strong></td>
<td><strong>2.870</strong></td>
<td><strong>.006b</strong></td>
<td></td>
</tr>
</tbody>
</table>

a) Dependent Variable: Intention to Purchase Grocery Online

b) Predictors: (Constant), Security Issues regarding Online Payment, Lack of social contact with other shoppers, High Product Price, Inability to Physically Examine the Product, High Delivery Charge and Time, Difficulty in returning products, No Guarantee, Unsuitable Delivery Hours, Forgery or Defective Product

Conclusions

The findings of the paper have demonstrated the applicability of Theory of Perceived behavioural Control which is directly influenced by perceived benefits of OGS.

The results have indicated a higher frequency of grocery being purchased by non-working respondents with a greater proportion of them purchasing it ‘2-3 times in a week’. The paper establishes a clear difference in perception of consumers depending upon their working status. The results of correlation analysis confirm that online grocery purchase intention is strongly influenced by factors like Convenience, Ease of Purchase, past experience, economy and quality, implying that Variety doesn’t prove to be important in considering the purchase. Findings of regression analysis reveal that perceived ease of purchase has greater effect than perceived convenience on working population’s intention to purchase grocery online. Whereas in case of non-working population, perceived convenience has a stronger impact than prior purchase experience.

Intriguingly, perceived barriers affecting the working consumers’ adoption of OGS are Inability to Physically Examine and Difficulty in returning products. However, in case of non-working population lack of physical examination, lack of social contact with others and high delivery charge and time are the major barriers of OGS.

Ethical Clearance- Taken from the Faculty of Management Studies, Amity University, Uttar Pradesh

Source of Funding- Self

Conflict of Interest– Nil

References


Effect of Barefoot Functional Rehabilitation in Flat Foot among Obese Women

Hemali Patel¹, S Anandh²

¹Physiotherapist, Faculty of Physiotherapy, KIMS ‘Deemed to be’ University, Karad, Maharashtra, India,
²Professor, Department of Community Health Sciences, Krishna College of Physiotherapy,
KIMS ‘deemed to be’ University, Karad, Maharashtra, India

Abstract

Background: Flat foot is among the commonest problems observed nowadays. There have been researches that prove weight to be an associated factor to flat foot. This study is carried out to find out effects of barefoot functional rehabilitation among obese women.

Objectives: To study the effect of Barefoot functional rehabilitation in flat foot among obese women.
To study the effect of conventional exercise alone in flat foot among obese women.
To compare the effect of barefoot functional rehabilitation along with conventional exercises VS conventional exercises alone in flat foot among obese women.

Method: 40 subjects were selected according to selection criteria. They were divided into 2 groups; barefoot functional rehabilitation group and other conventional group. Outcome measures were navicular drop test and foot function index.

Results: Results revealed that barefoot functional rehabilitation along with intrinsic muscle strengthening was more effective than intrinsic muscle strengthening alone in improving navicular drop score and foot function index in subjects with flat foot.

Conclusion: Barefoot functional rehabilitation exercises help in adapting the foot to different surfaces. These exercises help in strengthening certain smaller muscles of foot located at the bottom which helps in decreasing the navicular drop and foot function scores. Thus reduction in both the scores decreases the flat foot structure.

Keywords: obesity, foot abnormality, foot function index, navicular drop test.

Introduction

The most popular and convenient form of exercises that play an important role in weight management is walking, and foot is the essential component required for walking. The development of foot arch is rapid between 2-6 years of age and mature structurally around 12-13 years of age with slightest alteration in further ages due to weight problems etc. Footwear plays a crucial role in protecting the foot from trauma, however the deformations caused by shoes are considered to be a major contributing factor to forefoot pathology. In normal gait the subtalar joint starts to pronate post initial contact till the metatarsal head touches the ground, and thereafter the subtalar joint starts to supinate and converts the foot into a rigid structure for propulsion in the late stance phase. Repeated excessive loading...
may stretch ligament beyond their limits of elasticity, hence damaging soft tissues and increasing the risk of foot discomfort and subsequent development of foot pathologies. Such changes are observed in individuals that are overweight or obese. This discomfort may be caused due to heavy weight of body which may cause anatomical as well as kinematic changes in the body.

According to WHO, obesity is defined as abnormal or excessive fat accumulation that presents a risk to health. Obesity may be associated with several health problems such as dyslipidemia, hypertension, type 2 diabetes etc. Obesity have been shown to negatively affect foot structure and function both in children and adults. Nowadays flat feet is one of the most common conditions observed in adults. According to a research among physiotherapy students aged between 18-25, 18 years were having 2.5% of bilateral flat foot, 19 years were having 3.75% bilateral flat foot, 22 years were having 3.75% of bilateral flat foot, 24 years were having 1.25% bilateral flat foot. There are two types of flat foot: flexible flat foot and rigid flat foot. A flexible flat foot has an arch that is present in open kinetic chain (non-weight bearing) and lost in closed kinetic chain (weight bearing). A rigid flat foot has loss of the longitudinal arch height in open and closed kinetic chain.

Causes of flat foot might be congenital, adult flexible flat foot, posterior tibial tendon dysfunction, tarsal coalition, peroneal spastic flat foot, iatrogenic, post traumatic arthritis, charcot foot, neuromuscular flat foot. Adult flat foot presents symptomatic conditions with clinical consequences ranging from mild limitations to severe pain causing major life problems.

As feet are our main base of support during weight bearing activities it is stated that increased foot pain could act as a deterrent for obese individuals to participate in physical activity and indirectly perpetuate the obesity cycle.

Barefoot exercises not only exercises which give results physically, but they also are easy and efficacious to perform. Therefore, exercises can be implemented and also increased as per needs of individual. Due to these exercises the weakened structure of foot require considerable time for adjustment to new external stimuli; and hence treatment over weeks is recommended.

These exercises include short foot exercises, toe raise, unilateral and bilateral squats, single leg balance, trampoline single leg standing, balance board single leg standing, balance board exercises, grip exercise and walking on toes. There are intrinsic muscle strengthening exercises which are majorly used and show considerable change in individuals with flat foot but there is lack of awareness of barefoot exercises and its uses. Hence the effect of barefoot exercises can be known.

Thus, this study aims to find out the effect of barefoot exercises on obese women with flat foot.

Method

40 subjects were selected according to inclusion and exclusion criterion.

The Inclusion criteria was as follows:

- Female subjects.
- Age under 18-25 years.
- BMI > overweight or obese class 1, 2 or 3
- Obese adult with flat foot and symptoms of pain.
- Navicular drop: >10mm (On Navicular drop test)
- Subjects willing to participate.

The Exclusion criteria was as follows:

- Any recent surgeries in lower limb.
- Cardiovascular pathology.
- Any neurological problems.
- History of arthritis.
- Foot abnormalities.
- Uncooperative patients.

The subjects were divided into 2 groups by convenient sampling method. One group received barefoot functional rehabilitation exercises (short foot exercises, toe raise, unilateral and bilateral squats, proprioceptive exercise such as single leg balance, trampoline single leg standing, balance board single leg standing, balance board exercises, grip exercises of foot using different types of balls, walking on toes, walking on different surfaces like slippery flooring, rough surface etc) whereas, other group received intrinsic muscle strengthening exercises.

Outcome measures:

1. Navicular drop test:

For checking navicular drop, the subject was first
positioned in standing i.e weight bearing position. Using a small rigid ruler, the height of the navicular bone was measured from the floor to the most prominent part of the navicular tuberosity when in the neutral talar position. Again the height of the navicular bone was measured in relaxed sitting position i.e non weight bearing. The difference in measurement is the navicular drop and drop >10mm will be regarded as flat foot.

2. Foot function index: A Foot Function Index (FFI) was developed to measure the impact of foot pathology on function in terms of pain, activity restriction and disability. FFI consists of 17 questions items divided into 3 components. Each subjects were given FFI questionnaire according to inclusion criteria before starting the treatment. The scores of all 3 components were added which was divided 170 multiplied by 100 and percentage was calculated. This same procedure is carried out post treatment.

Result

1. Age distribution:

Age group of all participants were between 18-25 years. The mean age of the participants in Group A was 22.15 ± 1.725 and in Group B was 21.6± 2.186. There was no significant difference between the mean ages of the participants in both the groups. This was done by using unpaired t test (t_{40}=0.8832, p=0.3827)

<table>
<thead>
<tr>
<th>Table no.1 Mean age distribution.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean ± SD</strong></td>
</tr>
<tr>
<td>Group A</td>
</tr>
<tr>
<td>Group B</td>
</tr>
<tr>
<td>t value</td>
</tr>
<tr>
<td>P value</td>
</tr>
</tbody>
</table>

2. BMI distribution:

Body mass index of all participants was according to BMI chart. Overweight (25-29.9 kg/m²) and obese Class I, Class II and Class III were included. The mean BMI of the participants in group A was 33.59 ± 2.52 and group B was 36.99 ± 3.88.

<table>
<thead>
<tr>
<th>Table no. 2 Mean BMI distribution.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP A</strong></td>
</tr>
<tr>
<td>BMI</td>
</tr>
<tr>
<td><strong>GROUP B</strong></td>
</tr>
<tr>
<td>BMI</td>
</tr>
</tbody>
</table>

| Table no. 3 Comparison of pre and post Navicular drop test within groups. |
|-----------------------------|-----------------------------|-----------------------------|
|                            | NAVICULAR DROP TEST | P VALUE | INFERENCE |
|                            | PRE              | POST       |            |
| GROUP A                    | 12.05± 2.012      | 11.2± 1.881 | <0.0001   | Extremely significant |
| GROUP B                    | 12.3± 2.179       | 12.25± 2.173 | 0.3299    | Not significant       |

In the present study pre-interventional mean of Navicular drop score was 12.05±2.012 in Group A and 12.3± 2.179 in Group B whereas post interventionally mean of Navicular drop score was 11.2± 1.881 in Group A and 12.25± 2.173 in Group B. Intra group analysis of Navicular drop score revealed statistically reduction in navicular drop score in Group A.

Post values of NDT in Experimental group i.e Group A is found to be significant with p values <0.0001.

Group B with conventional treatment has no significant changes in NDT. Post values are nearly similar.

| Table no. 4 Comparison of pre-pre and post-post Navicular drop test in between groups. |
|---------------------------------------------|-----------------------------|-----------------------------|
| NDT                                        | PRE              | POST       |            |
| GROUP A                                    | 12.05±2.012       | 11.2± 1.881 |            |
| GROUP B                                    | 12.3± 2.179       | 12.25± 2.173 |            |
| P VALUE                                    | 0.7083            | 0.1106     |            |
| T VALUE                                    | 0.3769            | 1.634      |            |
| INFERENCE                                  | Not significant    | Not significant |            |

In the present study pre-interventional mean of Navicular drop test was 12.05±2.012 in Group A and 12.3± 2.179 in Group B whereas post interventionally
mean of Navicular drop test was 11.2±1.881 in Group A and 12.25±2.173 in Group B. Inter group analysis of Navicular drop test was done by unpaired ‘t’ test. Pre intervention analysis showed no significant difference between Group A and Group B (p= 0.7083). Post intervention analysis showed no significant difference between Group A and Group B (p= 1.634).

Table no. 5 Comparison of pre and post Foot Function Index scores within groups.

<table>
<thead>
<tr>
<th>FOOT FUNCTION INDEX</th>
<th>P VALUE</th>
<th>T VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>POST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP A</td>
<td>59.98 ±6.366</td>
<td>40.76± 6.153</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>GROUP B</td>
<td>59.48± 2.662</td>
<td>53.07± 7.726</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

In the present study pre-interventional mean of foot function index was 59.98 ±6.366in Group A and 59.48±2.662 in Group B, whereas post interventionally mean of foot function index was 40.76±6.153 in Group A and 53.07±7.726 in Group B. Intra group analysis of foot function index score revealed statistically reduction in foot function index scores for both groups. This was done using paired t test Group A (p<0.0001), Group B (p<0.0001).

Table no. 6 Comparison of pre-pre and post-post Foot Function Index in between groups.

<table>
<thead>
<tr>
<th>FFI</th>
<th>PRE</th>
<th>POST</th>
<th>P VALUE</th>
<th>T VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>59.98±6.36</td>
<td>40.76±6.15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROUP B</td>
<td>59.48±6.66</td>
<td>53.06±7.72</td>
<td>0.8096</td>
<td>&lt;0.0001</td>
<td></td>
</tr>
</tbody>
</table>

In the present study pre-interventional mean of foot function index was 59.98±6.366in Group A and 59.48±2.662 in Group B, whereas post interventionally mean of foot function index was 40.76±6.153 in Group A and 53.07±7.726 in Group B. Inter group analysis of foot function index score was done by using unpaired ‘t’ test. Post intervention analysis showed extremely significant difference between Group A and Group B (p<0.0001).

Discussion

According to studies, the incidence of flat foot has been reported to be 11.25% among a population of 18-25 years old students. Hence the study aims at finding the effect of barefoot functional rehabilitation in flat foot among obese women. Flat foot develops when there is change in lifestyle, comfortable flooring, less hours of standing work, over protection of the foot etc. criterion have been made for individuals having flat foot. Since, previous studies have set the criteria for flat foot as 1.15cm or more plantar arch index(17) and 10mm or greater navicular drop for flat foot (18-20), the subjects in the following study were selected based on the same criterion. There was extreme significance in the navicular drop and foot function scores in group A i.e the group receiving barefoot exercises like short foot exercises, unilateral and bilateral squats, grip exercises of foot using different types of balls, proprioceptive exercise using balance board, walking on toes, walking on different surfaces like slippery flooring, rough surface etc. These exercises were done without arch support and foot wear. These exercises help in adapting the foot to different surfaces. These exercises help in strengthening certain smaller muscles of foot located at the bottom which helps in decreasing the navicular drop and
foot function scores. Thus reduction in both the scores decreases the flat foot structure. The group B received intrinsic muscle strengthening exercises like ankle toe movement, toe curls and heel raise. It does not take part in the loading and unloading activities of the foot but may affect symptoms of flat foot like pain. The result from the statistical analysis of present study supported alternative hypothesis which stated that there will be beneficial effect to the subjects treated with barefoot functional rehabilitation along with conventional treatment. Hence above result showed that subjects treated with barefoot functional rehabilitation along with conventional treatment showed better navicular drop scores and decrease in foot function index scores with improvement in flat foot. Thus it can be stated from the above study that barefoot functional rehabilitation along with conventional treatment is more efficacious.

**Conclusion**

In conclusion, the present study provided evidence to support the use of Barefoot functional rehabilitation along with intrinsic muscle strengthening approach in improving navicular drop score and foot function index in subjects with flat foot. In addition, results supported that Barefoot functional rehabilitation along with intrinsic muscle strengthening was more effective than intrinsic muscle strengthening alone in improving navicular drop score and foot function index in subjects with flat foot. Thus the alternative hypothesis is proved.

**Conflicts of Interest:** This study can be carried out with more various forms of exercises and large sample size can also be taken into consideration.

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna Institute of Medical Sciences deemed to be university, Karad.

**Source of Funding:** Source of funding is Krishna Institute of Medical Sciences deemed to be university, Karad.

**References**

Effect of Core Stability Exercise Programme Using Swiss Ball, Theraband and Floor Exercises on Abdominal Girth and Core Strength in Post Menopausal Women

Vishakha Panchal¹, Amrutkuvar Pawar², Trupti Warude³, Khushboo Bathia⁴

¹Physiotherapist, Faculty of Physiotherapy, KIMS ‘Deemed to be’ University, Karad, Maharashtra, India,
²Assistant Professor, ³Assistant Professor, ⁴Assistant Professor, Department of Musculoskeletal Sciences, Krishna College of Physiotherapy, KIMS ‘deemed to be’ university, Karad, Maharashtra, India

Abstract

Background: Menopause is one of the biggest transitions in a women’s life. It leads to many anatomical, physiological as well as psychological changes in the body. Accumulation of fats in abdominal area and weight gain are also some of the major problems faced. Hence this study was carried out to find out the most effective among swiss ball, theraband and floor exercises in decreasing abdominal girth and increasing core strength in post menopausal women.

Objectives:
• To study the effect of core stability exercise using swiss ball on abdominal girth and core strength in post-menopausal women.
• To study the effect of core stability exercise using theraband on abdominal girth and core strength in post-menopausal women.
• To study the effect of core stability exercise using floor exercises on abdominal girth and core strength in post-menopausal women.
• To compare the effect of core stability exercise programme using swiss ball, theraband and floor exercises on abdominal girth and core strength in post-menopausal women.

Method: 60 subjects were divided into 3 groups ie: swiss ball, theraband and floor exercises. Outcome measures were BMI, waist circumference, waist hip ratio, abdominal skin fold thickness and double leg lowering test.

Results: There was statistically extreme significant difference (p<0.0001) seen in the waist hip ratio, abdominal skin fold thickness and core strength in the subjects receiving theraband exercises when compared with the other groups.

Conclusion: These results show theraband exercises as the most effective as it not only provides gravity as a challenge for muscles to work upon but also provides an additional component that is linear variable resistance which was also increased with increase in sets of exercises.

Keywords: menopause, obese, BMI, abdominal fat, double leg lowering test, skin fold thickness.

Correspondance: Vishakha Panchal,
Physiotherapist, Faculty of Physiotherapy,
Krishna Institute of Medical Sciences Deemed to be university, Karad 415110, Maharashtra, India.
Email id: vishakhapanchal1994@gmail.com
Ph no : 9769840745,

Introduction

There are two transition periods in a women’s life, both related to menstruation. Firstly, the start of menstruation around 12th year, ie; menarche and other at cessation of menstruation around 50th year, ie; menopause.¹ The post menopause period is the
span of time dating from the final menstrual period, regardless of whether the menopause is spontaneous or iatrogenic.\textsuperscript{2} Menopause is a transition phase from the reproductive to the non reproductive phase in a woman’s life.\textsuperscript{3}

The word menopause (menopausie) was used first time by a French physician de Gardenne.\textsuperscript{4} According to WHO Technical report series menopause is characterised by evidence of decreasing ovarian activity and biologically decreasing fertility and clinically alterations in the menstrual cycle intervals.\textsuperscript{5} According to a study, the mean age of menopause is 46 years in India.\textsuperscript{3} During this stage of women’s life there are possibilities of weight gain, muscle weakness which may lead to falls with advancing age.\textsuperscript{6}

Falls occur due to loss of static as well as dynamic balance. The loss of ability to balance the body may lead to lack of confidence. They may also feel hesitated and demotivated to participate in social gatherings or functions due to low self esteem. Dynamic balance of an elderly is supported by the core stabilizers.\textsuperscript{7}

Core stability is the ability to control the position and motion of the trunk over the pelvis to allow maximum production, transfer and control of force and motion.\textsuperscript{8} However, impairments of core stability are mainly caused by core muscle weakness.\textsuperscript{7}

The muscles around the abdominals and lumbar region such as rectus abdominis, erector spinae, quadratus lumborum, external oblique and gluteus comprise of core muscles.

As an attempt to strengthen these muscles, a programme using swiss ball, theraband and floor exercises are to be introduced. During exercises, knowing the trunk muscle activation levels is important in the prescription and design of exercise programs that aim to increase the training intensity over time.\textsuperscript{9}

Swiss ball exercises are beneficial as they are performed on an unstable surface, the level of muscle activity increases and to stabilise the spine muscle co activation takes place.\textsuperscript{10}

There are also researches that prove resistance exercises with the aid of unstable surfaces such as swiss ball are hypothesized to improve the functional capacity of patients because this workout affects balance and proprioception also.\textsuperscript{11} There are many studies that have proved core muscle recruitment during swiss ball abdominal exercises.\textsuperscript{12} Hence, we can refer as swiss ball as an beneficial object for the subjects. The elastic band manufacturers provide a range of such products of various resistance which can be distinguished by colours.\textsuperscript{13} Each colour signifying a level of resistance which would be offered to the patient by the band. The use of theraband exercises have been effective method of providing resistance and improving muscle strength.\textsuperscript{8}

Floor exercises also help to an extent for strengthening core muscles. Floor exercises for core stability should be trained in a progressive fashion, initially with local muscle recruitment, then moving to core stabilization in a variety of postures and then transitioning into total body dynamic movements.\textsuperscript{14}

According to previous researches, it is proved that post menopausal women show an increase in their abdominal girth along with weakness of abdominal muscles. There have been studies which are conducted to increase their strength and reduce abdominal girth, but this study aims at finding out the best and most effective exercises among swiss ball, theraband and floor exercises in relation to abdominal girth and core strength.

Thus, there should be a proper set of exercises which may help in weight reduction and at the same time may also help in maintaining proper balance. This study may also help in developing a good self imagine and boost their confidence.

**Method**

60 subjects were selected according to inclusion and exclusion criterion. The inclusion criteria was as follows:

- Post – menopausal women willing to participate in study.
- Age group 45 - 55 years
- Body mass index (BMI) 25 - 29.9 kg/m\(^2\) (pre obese) 30 - 34.9 kg/m\(^2\) (obese class 1)
- Waist hip ratio > 0.8 cms\textsuperscript{15}
The exclusion criteria was as follows:

- Subjects who have undergone abdominal surgeries 6 months prior to the study.
- Subjects who have undergone spinal surgeries.
- Subjects with prior experience of swiss ball, theraband and floor exercises.
- Subjects with acute low back ache or systemic conditions.
- Subjects on any other weight reduction plan e.g. medications, massage surgery during the study period.

They were divided into 3 groups A, B, C respectively by simple random sampling method.

(1) Treatment programme

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>(A) SWISS BALL</th>
<th>(B) THERABAND</th>
<th>(C) FLOOR</th>
</tr>
</thead>
</table>
| EXERCISES: | - Back extension  
- Plank exercise  
- Bridging  
- Spine rotation | - Trunk curl up  
- Trunk twist  
- Back extension  
- Side bend | - Arm lifts  
- Back extension  
- Pelvic tilt  
- Prone on hands |

The intensity shall be increased as follows:

- 1st week: 3 sets; 15 repetitions in each set
- 2nd week: 4 sets; 15 repetitions in each set
- 3rd week: 4 sets; 20 repetitions in each set
- 4th week: 4 sets; 20 repetitions in each set
- 5th week: 4 sets; 25 repetitions in each set

2 minutes rest was given after each set of exercise.

OUTCOME MEASURES:

i. Body mass index
ii. Waist circumference
iii. Waist hip ratio
iv. Abdominal skin fold thickness
v. Double leg lowering test

Result

Results were analysed using paired t test and ANOVA test respectively. Intra group comparison of BMI using paired t test.

(2) BMI - Intra Group comparison (within Group) using Paired t test.

<table>
<thead>
<tr>
<th>BODY MASS INDEX</th>
<th>P VALUE</th>
<th>INFERRENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE INTERVENTIONAL</td>
<td>POST INTERVENTIONAL</td>
<td></td>
</tr>
<tr>
<td>GROUP A</td>
<td>33.211 ± 1.966</td>
<td>33.211± 1.966</td>
</tr>
<tr>
<td>GROUP B</td>
<td>33.749± 1.443</td>
<td>32.814 ± 1.910</td>
</tr>
<tr>
<td>GROUP C</td>
<td>32.46± 2.820</td>
<td>32.46± 2.820</td>
</tr>
</tbody>
</table>

In Group B, the mean BMI on pre intervention was 33.749 ± 1.443 which was reduced to a mean of 32.814 ±1.910 post intervention (p=0.0012, very significant)
(3) WAIST HIP RATIO - Intra Group comparison (within Group) using Paired t test

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE</th>
<th>POST</th>
<th>P VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>0.9485± 0.1185</td>
<td>0.889± 0.2249</td>
<td>0.2494</td>
<td>Not significant</td>
</tr>
<tr>
<td>GROUP B</td>
<td>0.993± 0.1989</td>
<td>0.9305± 0.1674</td>
<td>0.0002</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>GROUP C</td>
<td>0.942± 0.09567</td>
<td>0.9305± 0.1050</td>
<td>0.0310</td>
<td>Significant</td>
</tr>
</tbody>
</table>

In the Group A, the mean waist hip ratio on pre intervention was 0.9485±0.1185 which was reduced to a mean of 0.889±0.2249 post sessions. (p=0.2494, not significant)

In Group B, the mean waist circumference on pre intervention was 0.993±0.1989 which was reduced to a mean of 0.9305±0.1674 post intervention. (p=0.0002, extremely significant)

In Group C, the mean waist circumference on pre intervention was 0.942±0.09567 which was reduced to a mean of 0.9305±0.1050 in post intervention. (p=0.0310, significant)

(4) SKIN FOLD THICKNESS- Intra Group comparison (within group)

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE</th>
<th>POST</th>
<th>P VALUE</th>
<th>INFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP A</td>
<td>46.8± 7.068</td>
<td>44.45± 9.293</td>
<td>0.0448</td>
<td>Significant</td>
</tr>
<tr>
<td>GROUP B</td>
<td>50.75± 11.729</td>
<td>40.5± 12.882</td>
<td>&lt; 0.0001</td>
<td>Extremely significant</td>
</tr>
<tr>
<td>GROUP C</td>
<td>51.5± 7.797</td>
<td>50.75± 8.117</td>
<td>0.0563</td>
<td>Not quite significant</td>
</tr>
</tbody>
</table>

In the Group A, the mean skin fold thickness on pre intervention was which 46.8± 7.068 was reduced to a mean of 44.45± 9.293 in post sessions. (p=0.0448, significant)

In Group B, the mean skin fold thickness on pre intervention was 50.75± 11.729 which was reduced to a mean of 40.5± 12.882 in post intervention. (p<0.0001, extremely significant)

In Group C, the mean skin fold thickness on pre intervention was 51.5± 7.797 which was reduced to a mean of 50.75± 8.117 in post intervention. (p=0.0563, not quite significant)

(5) SKIN FOLD THICKNESS- Inter group (between groups) comparison using ANOVA

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>46.8±7.068</td>
<td>44.45±9.293</td>
</tr>
<tr>
<td>Group (B)</td>
<td>50.75±11.729</td>
<td>40.5±12.882</td>
</tr>
<tr>
<td>Group (C)</td>
<td>51.5±7.797</td>
<td>50.75±8.117</td>
</tr>
<tr>
<td>P Value</td>
<td>0.2937</td>
<td>0.0436</td>
</tr>
<tr>
<td>Inference</td>
<td>Not significant</td>
<td>Significant</td>
</tr>
</tbody>
</table>

On comparing the pre interventional values, the results between the three groups using ANOVA test revealed (p=0.2937, not significant) While on comparing the post session values, the results between the two groups using ANOVA ( p=0.0436, significant)
(6) DOUBLE LEG LOWERING TEST- Intra Group comparison (within Group) using Paired t test

<table>
<thead>
<tr>
<th>GROUP</th>
<th>CORE STRENGTH</th>
<th>P VALUE</th>
<th>INERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRE</td>
<td>POST</td>
<td></td>
</tr>
<tr>
<td>GROUP A</td>
<td>47.5±12.927</td>
<td>44.8±13.532</td>
<td>0.0287</td>
</tr>
<tr>
<td>GROUP B</td>
<td>47.25±10.192</td>
<td>27.75±14.000</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>GROUP C</td>
<td>52±11.965</td>
<td>51.25±12.590</td>
<td>0.0563</td>
</tr>
</tbody>
</table>

In the Group A, the mean core strength on pre intervention was 47.5 ± 12.927 which was reduced to a mean of 44.8 ± 13.532 in post sessions (p=0.0287, significant).

In Group B, the mean core strength on pre intervention was 47.25±10.192 which was reduced to a mean of 27.75±14.000 in post intervention (p<0.0001, extremely significant).

In Group C, the mean core strength on pre intervention was 52 ± 11.965 which was reduced to a mean of 51.25 ± 12.590 in post intervention (p=0.0563, not quite significant).

(7) DOUBLE LEG LOWERING TEST- Inter group (between groups) comparision using ANOVA

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional Mean ± SD</th>
<th>Post-interventional Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>47.5±12.927</td>
<td>44.8±13.532</td>
</tr>
<tr>
<td>Group (B)</td>
<td>47.25±10.192</td>
<td>27.75±14.000</td>
</tr>
<tr>
<td>Group (C)</td>
<td>52±11.965</td>
<td>51.25±12.590</td>
</tr>
<tr>
<td>P Value</td>
<td>0.3586</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Inference</td>
<td>Not significant</td>
<td>Extremely Significant</td>
</tr>
</tbody>
</table>

On comparing the pre interventional values, the results between the three groups using ANOVA test revealed (p=0.3586, not significant). While on comparing the post session values, the results between the two groups using ANOVA test revealed (p<0.0001, extremely significant).

**Discussion**

The present study was conducted to find the most effective exercises for post menopausal women in relation to abdominal girth and core strength. Results of this study were focussed on body mass index, waist circumference, waist hip ratio, skin fold thickness using skin fold calliper and core strength using double leg lowering test. The results were analysed using paired t test and ANOVA test.

On comparing the values with paired t test ie; within the three groups, it was understood that the effect of swiss ball on waist circumference was not significant as well as the effect of floor exercises on skin fold thickness and core strength was not quite significant.

On analysing the data with ANOVA test ie; between groups, the results revealed that there was no statistically significant difference in BMI, waist circumference and waist hip ratio. The probable reasons for this negligible change could be because no vigorous physical activity or position modification or any treatment intervention focusing on body weight was given. The other reasons could be the sedentary lifestyle of the subjects. The subjects were not involved in any physical activities other than the designed exercises. They were also not involved in any aerobic exercises.

On comparing the values with paired t test, the results revealed that the effect of theraband on BMI was very significant (p=0.0012). The effect of swiss ball exercises, theraband exercises and floor exercises on waist circumference was extremely significant. The results also revealed to prove the theraband exercises to be the most effective as they showed statistically extreme significant difference in the waist hip ratio, skin fold thickness as well as core strength.

On analysing the data with ANOVA test, there was significant difference observed in the skin fold thickness and extremely significant in core strength. The theraband exercises proved to be more beneficial and maximum improvement was seen in the
theraband group on performing double leg lowering test. This may be due to more comfort in performing the theraband exercises than swiss ball and floor exercises. The swiss ball exercises, theraband and floor exercises all involve gravity as a component. Gravity also plays a role in all the exercises but in the theraband exercises there was an additional factor i.e the resistance which was exhibited by the elastic material of the bands. There was not only constant resistance but also an increase in the resistance was given which proved to be a reason for the essential benefit.

Further reasons for noticeable improvement seen in the subjects using therabands could be as they provide continuous tension on the muscle to be trained. The other factor may be because the elastic resistance that offers a linear variable resistance.10.

The other factors which prove to be a reason for more effect of theraband exercises over swiss ball exercises may be as the swiss ball exercises may exert more difficulty of exercises using an exercise ball that varies for each person and challenge areas of stiffness, inflexibility and may be strength improvement is not better than that of theraband.

Considering the above inferences it can be concluded that theraband exercises prove to be the most beneficial and effective among swiss ball and floor exercises in decreasing abdominal girth and increasing core strength.

**Conclusion**

There are various attempts made by the post – menopausal women to decrease their body fat and increase core muscle strength but from this study it is concluded that theraband exercises were the most effective among swiss ball and floor exercises for decreasing abdominal girth and increasing core strength.

Results revealed that exercises of all the three groups; swiss ball, theraband as well as floor proved to be effective and showed improvement. There was maximum effect seen in theraband exercises followed by swiss ball and then floor exercises.

**Conflicts of Interest:** This study can be carried out with more various forms of exercises and large sample size can also be taken into consideration.

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna Institute of Medical Sciences deemed to be university, Karad.

**Source of Funding:** Source of funding is Krishna Institute of Medical Sciences deemed to be university, Karad.

**References**

11. Marcello Cardoso de Souza et al. Swiss ball exercises
improve muscle strength and walking performance in ankylosing spondylitis: a randomised controlled trial. Rev bras reumatol, 2017; 57(1);45-55


A Community based Cross Sectional Study to Assess the Association between Indices of Obesity and Hypertension

Arun Varghese, Prakash M Durgawale, Satish V Kakade, Dhirajkumar A Mane, Supriya S Patil

1Assistant Professor, Department of Community Medicine, DMWIMS (Dr Moopen’s Wayanad Institute of Medical Sciences), Wayanad, Kerala., 2Professor & Head, 3Associate Professor cum Statistician, 4Statistician, Directorate of Research, KIMSDU, 5Associate Professor, Dean of Academics,Department of Community Medicine, Krishna Institute of Medical Sciences, Karad, Satara, (Maharashtra) India

Abstract

Background: Hypertension is associated with a reduced quality of life and also an increased risk for various cardiovascular, renal, neurological and multiple systemic complications. Objectives: To determine the prevalence of hypertension and to find out the association between anthropometric indices and hypertension. Material and Method: A cross-sectional survey was conducted in 1509 individuals ≥30 years in the rural population of Kasegaon village, Maharashtra by a house to house survey during December 2015 to May 2016. Blood pressure (BP), Waist Circumference (WC), Waist Hip Ratio (WHR) and Body Mass Index (BMI) were measured according to WHO guidelines. Data was analyzed in SPSS version 20 using chi-square test and odds ratio. Results: The prevalence of hypertension in our study was 10.74%. An increase in BMI, WC, WHR were found as risk factors for hypertension. 6.8% (n=7) were hypertensives among those with underweight, 7.5% (n=75) of the population with a normal BMI were found to be hypertensive, 13.0% (n=42) were hypertensives among the overweight category, and 19.5% (n=16) were hypertensive among the obese category. The prevalence of hypertension among those having normal WC was found to be 7.3% (n=88), 12.7% (n=18) were hypertensive among those with WC in the increased risk category and the 21.4% (n=34) were hypertensive among those who had a substantially increased risk WC. Among those who were in less risk WHR category, the prevalence of hypertension were 7.2% (n=88) and 18.2 % (n=52) individuals were hypertensives among the substantially increased risk WHR category. Conclusion: The importance and need of weight reduction by increasing physical activity, lifestyle modification should be incorporated into the community to control this problem.

Keywords: Hypertension, Body Mass Index, Waist Circumference, Waist Hip Ratio.

Introduction

The wealthy and resource constrained countries are now facing the same health issues the shift of communicable diseases to Non-Communicable Diseases(NCDs) such as cardiovascular disease, cancer, diabetes and chronic lung diseases, as the world’s leading cause of mortality.1

According to the World Health Organization (WHO) estimates in 2015, 17.7 million deaths (accounting for 45% of all NCD deaths; cancer, 8.8 million deaths (22%); chronic respiratory disease, 3.9 million deaths (10%); and diabetes, 1.6 million deaths (4%)(2,3).

One of the key risk factors for cardiovascular disease is Hypertension (HTN) which already affects one billion people worldwide, leading to heart attacks and strokes. Researchers have estimated that raised blood pressure currently kills 9 million people every year. Hypertension is ranked as the third most important risk factor for attributable disease burden

Corresponding author:
Dr. Prakash M Durgawale,
Professor and Head, Department of Community Medicine, KIMS, Karad, Maharashtra

DOI Number: 10.5958/0976-5506.2019.00662.4
in south Asia\(^4,5\). It exerts a substantial public health burden on cardiovascular health status and healthcare systems in India\(^5,6\) and is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths\(^5\). The WHO ranks HTN as one of the most important causes of premature death worldwide \(^5\). But there is no need of this risk to be so high, because hypertension is a preventable disease condition\(^1,4\). And doing so is far less costly, and far safer for patients, than the costlier and complicated interventions (cardiac bypass surgery, dialysis) which may be needed when HTN goes undiagnosed and untreated\(^1\).

Aim: To provide necessary feedback to improve the effective delivery of health care services, with special reference to hypertension in the rural population residing in western Maharashtra.

**Objectives**

- To determine the prevalence of hypertension among adult population above 30 years in the rural field practice area under RHTC, Kasegaon.
- To determine an association, if exists; between anthropometric indices and hypertension among the study subjects.

**Material & Method**

This was a descriptive cross-sectional study of adults aged ≥30 years carried out in Kasegaon village, adopted by the KIMS tertiary care centre, Karad, Western Maharashtra, conducted between December 2015-May 2016. Total population of Kasegaon village is 13581, comprising of 5924 females and 6477 males. There were 2397 households in Kasegaon, divided in 5 wards of the village (2011 census).

Using a prevalence (p) of 10% \(^5\) and absolute precision (L) of 1.6 % with 95% confidence interval, the required sample size was estimated to be 1407, using the formulae \(n=4pq/L^2\). Considering a 10% non response rate we decided to collect 1550 samples, However, after analysis 1509 samples were obtained because 41 samples were non responsive. All adults ≥30 years willing to participate in the study were included, whereas those who were absent even after 3 repeated visits on the same week, pregnant and lactating mothers within 6 months of delivery, non-permanent residents of Kasegaon, non-cooperative subjects, persons with chronic illnesses and secondary HTN were all excluded from the study.

The study was conducted after obtaining institutional ethical clearance and with the permission from the Gram Panchayat of Kasegaon.

After obtaining informed consent, data was collected from each of the 5 wards, by house to house visit, using a pretested, modified and validated structured questionnaire. In each ward, we reached at the approximate centre and from there a main land mark was taken as the starting point and followed a clockwise direction for obtaining the samples. Minimum 282 samples were studied from each ward for attaining the desired sample size of 1550 adults. BP was measured according to WHO guidelines, BMI was measured according to the WHO STEPS protocol \(^7,8\), WC and WHR was measured based on the WHO sex specific cut off points for WHR \(^9,10\). Data was entered in SPSS version 20.0. The association of study variables with status of hypertension was assessed by applying chi-square test. A p value of < 0.05 was considered statistically significant. Odds ratio was calculated to find out the association between hypertension and its risk factors.

**Results**

![Sex wise age distribution of the study population](chart)

Figure 1: Sex wise distribution of the study population

Unpaired-t =1.745, p=0.087

Figure 1 reveals that; among the total 1509 study subjects, 55.5% (n=838) were females and 44.5% (n=671) were males. (Age range of the male and female population were 30-100 years and 30-98 years respectively, Mean age of females and males were 49 yrs and 50 yrs respectively). Unpaired t- test was found to be 1.745 and p-value was insignificant which was 0.087 (p>0.05). No significant difference in the sex-wise distribution of population was observed.
Figure 2: Distribution of respondents according to awareness and treatment level among hypertensive patients.

Table 1: Distribution of hypertensive cases according to Body Mass Index.

<table>
<thead>
<tr>
<th>Class (BMI)</th>
<th>Hypertension</th>
<th>Total</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Total</td>
</tr>
<tr>
<td>Normal</td>
<td>927 (92.5%)</td>
<td>75 (7.5%)</td>
<td>1002 (100%)</td>
</tr>
<tr>
<td>Under weight</td>
<td>96 (93.2%)</td>
<td>7 (6.8%)</td>
<td>103 (100%)</td>
</tr>
<tr>
<td>Over weight</td>
<td>280 (87.0%)</td>
<td>42 (13.0%)</td>
<td>322 (100%)</td>
</tr>
<tr>
<td>Obesity</td>
<td>66 (80.5%)</td>
<td>16 (19.5%)</td>
<td>82 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>1369 (90.7%)</td>
<td>140 (9.3%)</td>
<td>1509 (100%)</td>
</tr>
</tbody>
</table>

Figures in parentheses denote row percentages.  
*Chi-square* = 20.209, *p* < 0.001
A high prevalence of hypertension was observed among the overweight (13.0%) and obese (19.5%) individuals when compared to those with underweight (6.8%) and 7.5% with a normal BMI. There was a proportionate increase in blood pressure with respect to BMI and was found to be statistically significant (p-value < 0.001). Participants who were overweight were having 17.9 times more chance (OR 1.854; 95% CI 1.242-2.768) and those who were obese were having 1.7 times more chance (OR 2.996; 95% CI 1.653-5.432) of becoming hypertensive when compared to those who were normal.

Table 2: Distribution of hypertensive cases according to Waist Circumference among the study population.

<table>
<thead>
<tr>
<th>Waist Circumference</th>
<th>Hypertension</th>
<th>Total</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>1120 (92.7%)</td>
<td>88 (7.3%)</td>
<td>1208 (100.0%)</td>
</tr>
<tr>
<td>Increased risk</td>
<td>124 (87.3%)</td>
<td>18 (12.7%)</td>
<td>142 (100.0%)</td>
</tr>
<tr>
<td>Substantially increased risk</td>
<td>125 (78.6%)</td>
<td>34 (21.4%)</td>
<td>159 (100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>1369 (90.7%)</td>
<td>140 (9.3%)</td>
<td>1509 (100.0%)</td>
</tr>
</tbody>
</table>

Figures in parentheses denote row percentages.  
*Chi-square = 35.334, p < 0.001*

The prevalence of hypertension among those who had normal waist circumference (WC) was found to be 7.3% (n=88), 12.7% (n=18) prevalence among increased risk waist circumference category and 21.4% (n=34) prevalence among substantially increased risk waist circumference category. Chi square value was 50.347 and the p-value was <0.001. Participants who were having increased risk waist circumference were having 1.8 times more chance (OR 1.848; 95% CI 1.077-3.170) and those who were having a waist circumference at substantially increased risk category are having 3.5 times more chance (OR 3.462; 95% CI 2.236-5.359) of becoming hypertensive when compared to those who were having waist circumference at normal level.

Table 3: Distribution of hypertensive cases according to Waist Hip Ratio (WHR) among the study population.

<table>
<thead>
<tr>
<th>WHR</th>
<th>Hypertension</th>
<th>Total</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Less risk</td>
<td>1135 (92.8%)</td>
<td>88 (7.2%)</td>
<td>1223 (100.0%)</td>
</tr>
<tr>
<td>Substantially increased risk</td>
<td>234 (18.2%)</td>
<td>52 (18.2%)</td>
<td>286 (100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>1369 (90.7%)</td>
<td>140 (9.3%)</td>
<td>1509 (100.0%)</td>
</tr>
</tbody>
</table>

Figures in parentheses denote row percentages.  
*Chi-square = 33.240, p < 0.001*

The prevalence of hypertension was 7.2% among the normal (less risk) waist hip ratio category compared to 18.2% among the substantially increased risk waist hip ratio category. An increasing trend in the prevalence of hypertension was observed with an increasing waist hip ratio. Chi square value was 43.942 and the p-value was < 0.001. Participants who were having a WHR at substantially increased risk category are having 15.8 times more chance (OR 15.764; 95% CI 11.946-20.8021) of becoming hypertensive when compared to less risk WHR category.

Discussion

The aim of this study was to provide necessary feedback to improve the effective delivery of health care services, with special reference to hypertension in the rural population residing in western Maharashtra. Early diagnosis and treatment of hypertension is necessary to initiate preventive measures and to prevent complications.
In our study there was no significant difference between the age and sex-wise distribution of the study population. Similar findings were observed by Anchala R. et al.(5), Deo M.G. et al.(11) in a study conducted in coastal Maharashtra and Premanandh K. et al. (12) in Goa.

The prevalence of pre hypertension and hypertension has been increasing in India especially in urban areas, but now in to the rural areas also(13). The overall prevalence of hypertension from the study was 10.74% among the study subjects. Similar results were obtained in a meta-analysis review of prevalence, awareness and control of hypertension by Anchala R. et al.(5), but lower than the IDSP phase-1 (Integrated Disease Surveillance Project) survey(13). The prevalence of pre-hypertension was high (60%) in our study. A lower prevalence was observed in the Boloor diabetic study (40.4%) (14). The very famous and common “rule of halves” in the epidemiology of hypertension suggests that among the hypertensives, only about half of hypertensive populations are diagnosed (aware of the condition), half of those diagnosed are treated, and half of those treated are adequately treated (controlled); these estimates may be optimistic in many developing countries(15,16,17) diagnosis, treatment, and control among middle-income countries. We analyzed data from 47 443 adults in all 6 middle-income countries (China, Ghana, India, Mexico, Russia, and South Africa). In our study much less than 50% were aware of their hypertensive status (only 20.37% were aware; 33/162=20.37%), but among those who were aware of their condition, more than 50% were treated (87.88%; 29/33=87.88%) and among the treated ones, more than 50% were adequately treated (75.86%; 22/33=75.86%). Hence, a lot of further research on screening and adherence strategies, as well as quality improvement at healthcare delivery system to ensure titration of medications, which are crucial for improving outcomes is required.

In our study there was a proportionate increase in hypertension with respect to BMI and was found to be statistically significant (p-value < 0.001). Similar results were observed in a study done by Imaad Mohammed Ismail et al(18) Premanandh K. et al.(92), Ajeet S.Bhadoria et al., (19) and Sanjeet Panesar et al(110). This may be because obese individuals have an increase in fatty tissue that increases their vascular resistance and in turn increases the work the heart has to do to pump blood throughout the body. In our study, it was noted that there was a progressive trend of hypertension as the waist circumference moves (increases) to substantially high risk category (21.4% prevalence). It was also seen that as the waist hip increases to the substantially increased risk category (Chi square was 43.942 and p-value was < 0.001), the prevalence of hypertension also intensified. Participants who were having a waist hip ratio (WHR) at substantially increased risk category are having 15.8 times more chance (OR 15.764; 95% CI 11.946-20.8021) of becoming hypertensive when compared to those who were having a waist circumference at a less risk category. Many studies suggest waist circumference (WC), BMI and hip circumference are associated with cardiovascular outcome, independent of traditional risk factors. However, WC appears to be a better predictor for cardiovascular risk than other parameters. Waist–hip ratio is not as useful as other measurements(20).

**Conclusion**

According to this study it was found that one-tenth (10.74%) of the rural adult population of Western Maharashtra are hypertensive. Further research is required to document the impact of family structure, physical activity, smokeless tobacco use, family history, obesity and stress on blood pressure among the study population. There is a need for urgent call for early diagnosis, prevention and control measures for hypertension.

**Recommendations**

Appropriate public health education must be imparted through schools starting from primary education, existing or newer national health and hospital outreach programmes to raise awareness about the role of exercise, weight reduction, healthy diet and lifestyles, addictive and harmful nature of tobacco products and alcohol abuse.

As stress been found to have a significant association towards hypertension, national programmes should include preventive and control measures against stress.

**Limitations:** Being an observational study, causality was not inferred and no follow ups were done.

**Source of Funding:** Self

**Conflicts of Interest:** None.

**References**


Attitude Towards Ageing among Older Population

B Jayabharathi1, Nisha Yadav2, Tharageshwari2, Buvana2

1Associate Professor, Department of Obstetrics & Gynaecology Nursing, 2B.sc (N) IV Year Students, SRM College of Nursing, SRM Institute of Science & Technology, Kattankulathur, Kancheepuram District, Tamil Nadu

Abstract

Introduction: Ageing is a life spanning process of growth and development from birth to death. The ageing process occurs in every living species, and also in human beings by greying of hair, wrinkling of skin, hardening of arteries, aches and pains in joints and weakening of eye sight.

Aim: The aim of the study is to assess the attitude towards ageing among older population.

Methodology: Non experimental descriptive research design was adopted to assess the attitude towards aging among older population. The study was conducted at SRM general hospital, Kattankulathur, Kanchipuram district. 100 older people who fulfilled the inclusion criteria were selected by using non probability convenient sampling technique. Structured questionnaire was used to assess the demographic variables of older people. Five point likert scale was used to assess the attitude towards aging among older people.

Results: The findings depicted that, majority 59 (59%) older people had moderately favourable attitude towards ageing, 41 (41%) had favourable attitude and no one had unfavourable attitude towards ageing. The results revealed that there was significant association found between attitude towards aging among older population with occupation, but there was no significant association found between attitude towards aging among older population with other demographic variables such as age, gender, religion, education status, family income, place of residence and presence of any disease conditions.

Conclusion: The perception of the public about the older people can have impact on the elderly in employment, education, and health services, and in the general treatment. Further research is needed to examine public perceptions of older people, and the nature and direction that they take, so that interventions can be developed to ensure that older people can live with better quality of life.

Keywords: Attitude, Ageing, Older population

Introduction

Ageing is a life spanning process of growth and development from birth to death. Old age is an integral part of the whole, bringing fulfillment and self actualization. The ageing process occurs in every living species, and also in human beings by greying of hair, wrinkling of skin, hardening of arteries, aches and pains in joints and weakening of eye sight. The way that older adults adjust to the changes of ageing depends on the individual. For some individuals, adaptation and adjustment are relatively easy, where as for other individuals coping with ageing changes may require the assistance of family, friends and health care professional.

As people age, their health needs tend to become more complex with a general trend towards declining capacity and the increased likelihood of having one
or more chronic diseases. Health services are often designed to cure acute conditions or symptoms and tend to manage health issues in disconnected and fragmented ways that lack coordination across care providers, settings and time. 

A recent Health Service Executive (HSE) (2009) report highlighted that, how people’s attitudes and perceptions can have a significant negative impact on the lives of older people. Ageism and ageist attitudes are not the sole factors contributing to elder abuse but can give rise to a culture which creates a fertile environment in which elder abuse can develop, leading to age discrimination, and devaluing and disempowering older people.

In 1975, Butler used the term ageism to refer to “a process of systematic stereotyping of and discrimination against people because they are old”. More than 35 years after he coined the term, Butler (2005) still considers ageism to be deeply embedded in our society. As the proportion of older adults continues to increase in both the population and the labor force, it becomes increasingly important to understand the determinants of attitudes towards the elderly so that it may be possible to promote more positive attitudes in young adults.

Fraboni, Saltstone, and Hughes (1990) have argued that, the Aging Semantic Differential Scale is limited in that it only measures the cognitive components of ageism. In order to assess more completely the concept of ageism, then Fraboni Scale of Ageism (FSA) (Fraboni et al.) was developed. The FSA comprises items designed to assess both the affective as well as the cognitive component of ageist attitudes. Research using the FSA finds that university students, as well as a community based sample of adults of all ages, hold negative attitudes about the elderly. Compared to women, men are consistently found to have more ageist attitude.

Denver J. Miller, et.al conducted a study to examine physicians’ attitudes toward and knowledge concerning driving in older persons. The questionnaire explored physicians’ practice characteristics, general approach to record keeping, frequency of behavior toward educating, counseling, and reporting patients to authorities when deemed appropriate, and their personal understanding of driving issues and physician responsibilities within the state in which they practice. A response rate of 48% was obtained. There was a lack of consensus among physicians, with a broad range of attitudes and practices dealing with this growing public health concern.

The perception of the public about the older people can have impact on the elderly in employment, education, and health services, and in the general treatment. Further research is needed to examine public perceptions of older people, and the nature and direction that they take, so that interventions can be developed to ensure that older people can live with better quality of life.

The present study aims to assess the attitude towards ageing among older population at SRM General Hospital, Kattankulathur, Kancheepuram dist.

**Methodology**

The study was conducted at SRM general hospital, Kattankulathur, Kanchipuram district. Non experimental-descriptive research design. Was adopted for the study. 100 older population who fulfilled the inclusion criteria were selected by using Non-probability–convenient sampling technique. The inclusion criteria includes a. Older population who were available during the period of study, b. Older population who were in the age group of 60-75 years& c. Older population who could able to understand English and Tamil. The exclusion criteria includes a. Older population who were not willing to participate the in study & b. Older population who were with psychiatric illnesses.

**DEVELOPMENT AND DESCRIPTION OF THE TOOL**

It consists of two Sections

**SECTION A:** Structured questionnaire was used to assess the demographic variables of older population which includes age, gender religion, educational status, occupation, family monthly income, place of residence and presence of any disease condition.

**SECTION B:** 5 point likert scale was used to assess attitude towards ageing among older population. The scale consisted of 20 statements with 10 positive worded and 10 negative worded statements. The respondents were asked to indicate the level of agree or disagree the statement against the column given.
SCORING INTERPRETATION

<table>
<thead>
<tr>
<th>LEVEL OF ATTITUDE</th>
<th>SCORING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorable attitude</td>
<td>&gt;70%</td>
</tr>
<tr>
<td>Moderately favorable attitude</td>
<td>51-70%</td>
</tr>
<tr>
<td>Unfavorable attitude</td>
<td>≤50%</td>
</tr>
</tbody>
</table>

Reliability of The Tool

Reliability of the tool was established by split half method. The coefficient correlation $r = 0.75$ which was high. Hence, the tool was considered reliable and feasible for proceeding with the main study.

Ethical Considerations

The research proposal was approved by research committee of SRM College of nursing, SRM University, Kattankulathur, Kancheepuram district. Permission was obtained from the Dean, SRM College of Nursing and Medical Superintendent, SRM General Hospital. Informed consent was obtained from the study participants, after explaining the nature and duration of the study. Assurance was given to the individual that report will be kept confidential.

Results

Table 1: Frequency and percentage distribution of demographic variables of older population  $n = 100$

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Demographic Variables</th>
<th>Class</th>
<th>No. of Respondents (n)</th>
<th>Percentage distribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age in years</td>
<td>60 - 65 Years</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>66 - 70 Years</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>71 - 75 Years</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td>Male</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>3</td>
<td>Religion</td>
<td>Hindu</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Christian</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Muslim</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Others</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Educational status</td>
<td>Illiterate</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Primary school certificate</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle School certificate</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school certificate</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intermediate or post high school diploma</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graduate or post graduate</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Profession or Honor</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Occupation</td>
<td>Unemployed</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unskilled worker</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semi skilled worker</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skilled worker</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clerical Shop-owner Farmer</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Semi Professional</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Professional</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
**Table 1: Frequency and percentage distribution of demographic variables of older population**

<table>
<thead>
<tr>
<th>Presence of any disease conditions</th>
<th>Anemia</th>
<th>Cardiac disease</th>
<th>Diabetes mellitus</th>
<th>Diabetes mellitus and cardiac disease</th>
<th>Diabetes mellitus and hypertension</th>
<th>Hypertension</th>
<th>Hypotension</th>
<th>Nil</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 100</td>
<td>1</td>
<td>4</td>
<td>18</td>
<td>1</td>
<td>11</td>
<td>10</td>
<td>1</td>
<td>54</td>
</tr>
</tbody>
</table>

Regarding the age, most of them 58 (58%) belonged to the age group of 60-65, 20 (20%) belonged to the age group of 66-70 and only 22 (22%) were in the age group of 71-75. Regarding the gender, most of them 56 (56%) of them were male and 44 (44%) of them were female. Considering the religion, most of them 78 (78%) belonged to Hindu religion and 14 (14%) was Christian, 7 (7%) were Muslim and 1 (1%) belonged to other category. Regarding the educational status 35 (35%) were illiterate, 16 (16%) were completed primary school certificate, majority 31 (31%) had completed middle school certificate, 4 (4%) had completed intermediate and post high school diploma, 3 (3%) had completed graduate or post graduate and only 1 (1%) had completed professional course. Regarding the occupation, 50 (50%) were unemployed, 4 (4%) were unskilled worker, 6 (6%) were semi skilled worker, 9 (9%) were skilled worker, 5 (5%) were clerical, shop owner, farmer, only 4 (4%) were semi-professional and around 20 (20%) were professional. Considering the presence of any medical conditions, 1 (1%) had anemia, 4 (4%) had cardiac disease, 18 (18%) had diabetes mellitus, 1 (1%) had diabetes mellitus and cardiac disease, 11 (11%) had both diabetes mellitus and hypertension, 10 (10%) had hypertension, 1 (1%) had hypotension and 54 (54%) had no disease.

**Table 2: Frequency and percentage distribution of attitude towards ageing among older population.**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Level of Attitude</th>
<th>No. of respondents (n)</th>
<th>Percentage Distribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Favorable Attitude</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>Moderately Favorable Attitude</td>
<td>59</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>Un favorable Attitude</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The findings depicted that, majority 59 (59%) older people had moderately favorable attitude towards ageing, 41 (41%) had favorable attitude and no one had unfavorable attitude towards ageing.

**Table 3: Association of attitude towards ageing among older population with their demographic variables.**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Demographic Variables</th>
<th>Class</th>
<th>Level of Stress</th>
<th>Chi-Square Value</th>
<th>DF</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>60 - 65 Years</td>
<td>Favorable Attitude</td>
<td>38</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>66 - 70 Years</td>
<td>Moderately Favorable Attitude</td>
<td>12</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>71 - 75 Years</td>
<td>Chi-Square Value</td>
<td>4.003</td>
<td>2</td>
<td>0.135</td>
</tr>
<tr>
<td>1</td>
<td>Age in years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The results revealed that there was significant association found between attitude towards aging among older population with occupation and there was no significant association found between attitude towards aging among older population with other demographic variables such as age, gender, religion, education status, family income, place of residence and presence of any disease conditions.

**Discussion**

Ageing is the process of becoming older. In humans, ageing represents the accumulation of changes in a human being over time encompassing physical, psychological and social changes. Although the body and mind go through many natural changes as they age, not all changes are normal. There are many misconceptions about what is a normal part of aging. Older age is also characterized by the emergence of several complex health states that tend to occur only later in life and that do not fall into discrete disease categories. These are commonly called geriatric syndromes. They are often the consequence of multiple underlying factors and include frailty, urinary incontinence, falls, delirium and pressure ulcers.

The present study findings depicted that, majority 59 (59%) older people had moderately favorable attitude towards ageing, 41 (41%) had favorable attitude and no
one had unfavorable attitude towards ageing.

The findings are consistent with the study done by Debra Deasey, et.al(2011) on nurses’ knowledge of ageing and attitudes towards older people on therapeutic interactions in emergency care. Sixteen articles were reviewed, including seven cross-sectional surveys, seven qualitative studies and two mixed-methods studies. Emergency department nurses’ attitudes towards and knowledge about ageing processes may affect therapeutic interactions between nurses and their older patients. Issues such as managerial style, past experiences and the medical model used for health-care delivery were secondary factors shown to influence emergency nurses’ negativity towards their older patients.\(^8\)

The findings are consistent with the study done by Soonrim suh, et.al (2011) on the association between knowledge and attitude about aging and life satisfaction among older Korean. A total of 405 older adults were surveyed using a written questionnaire at six elderly welfare centers in a metropolitan city in South Korea in mid April 2011. The score of knowledge on aging was below the medium level. Attitude about aging was neutral, and life satisfaction was at the medium level. Variables such as female sex, age, economic status, monthly allowance, living with a spouse, self-rated overall health, knowledge and attitude about aging accounted for 33.8% of the total variance in predicting life satisfaction of the older adults. Older age and lower economic status reduced life satisfaction. Being female, having a monthly income of 300,000 Korea Republic Won or more, living with a spouse, and better knowledge and attitude about aging were associated with enhanced life satisfaction.\(^9\)

**Conclusion**

The present study results conclude that, majority of the older population 59% had moderately favorable attitude towards aging. The perception of the public about the older people can have impact on the elderly in employment, education, and health services, and in the general treatment. Further research is needed to examine public perceptions of older people, and the nature and direction that they take, so that interventions can be developed to ensure that older people can live with better quality of life.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**References**

2. Ageing and life-course, Health systems that meet the needs of older people . Available from : www. who.int/ageing/health-systems/en
Impact of Farm Technology on Rice Production in Madurai District, Tamilnadu

S Thangamayan¹, B Chithirairajan¹, S Sudha¹

¹Assistant Professor, Department of Economics, VELS Institute of Science, Technology and Advanced Studies, Chennai

Abstract

The crucial importance of green revolution is to achieving higher yield of productivity and encouraging crops production in all over the places. The major objective of green revolution was to increase the agricultural production to meet out the ever growing demand for food grains due to never ending process of population expansion. It is grown in almost all the states of India but it is mostly concentrated in the river valleys, deltas, and low lying coastal area of North Eastern and Southern India. The rice producing states are Assam, West Bengal, Bihar, Madhya Pradesh, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Mysore, Maharashtra, Gujarat, and Uttar Pradesh, Jammu and Kashmir which together contribute over 95 per cent of the country’s rice production. Hence, the present study makes an attempt to analyse the impact of rice production in Madurai district, Tamil Nadu. By and large, the study concluded that small farmers are economically more efficient than large farmers irrespective of varieties of rice cultivation in the study area. This is indicated that apart from efficient allocation of inputs, direct supervision and farm management are crucial determinants of economic efficiency.

Keywords: rice production, economic efficiency, management, green revolution, farm technology.

Introduction and Statement of the Problem

No doubt, agriculture is a major livelihood source and it is a backbone of India. Indian agriculture and allied activities were depressed after the Indo-Pakistan and Indo-China wars in 1960’s. Further, the prices of raw materials, jute products, oil seed products and food stuffs were rose at high level. A serious problem was initiated in agricultural sector due to the shortages of food grain productions and the demand for food production was increased on account of war and prisoners, increased consumption in home country, the supply level is also decreased due to that reduction in the marketable surplus. On the other hand, fear of currency devaluation, and the expectation of increase in price level led to stock maintaining by traders, consumers and the farmers much beyond the normal requirements. It brought out that food scarcity and price raised in India. In view of price increased in agricultural goods benefitted only to landlords and Zamindars. But, the farmers were paid huge amount of interest to the creditors, and the position of agricultural labourers felt down, it brought out that the farmers were decided to suicide or shifted from agricultural sector to industrial sector i.e., the farmers were migrated from rural area to urban area. In view of these drawbacks, the father of green revolution M.S. Swaminathan has introduced the new agricultural strategy programme which was initiated in 1966 in the name of Green Revolution and it was first implemented in Punjab for the purpose of to improving wheat production in India. In Tamil Nadu, most of the farmers were cultivated rice production with the effort of Green Revolution. The major aim of green revolution is to implement the high yielding varieties of seeds, improving irrigation facilities, applying high doses of fertilizers, pesticides, using rotator, cultivator and tractor in agricultural land. The crucial importance of green revolution is to achieving higher yield of productivity and encouraging crops production in all over the places. It is interesting to note that, the agricultural production was rose by the way of adopting farm technology method in green revolution scheme. However, the major objective of green revolution was to increase the agricultural production to meet out the ever growing demand for
food grains due to never ending process of population expansion. For our surprise agricultural production was increased from 55 million tonnes to 225 million tonnes in 20th century. It is very significant to note that one third of the world’s rice area in India i.e. 83 million hectares. It is grown in almost all the states of India but it is mostly concentrated in the river valleys, deltas, and low lying coastal area of North Eastern and Southern India. The rice producing states are Assam, West Bengal, Bihar, Madhya Pradesh, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Mysore, Maharashtra, Gujarat, Uttar Pradesh, Jammu and Kashmir which together contribute over 95 per cent of the country’s rice production. Of these, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu and Bihar are the major rice producing states. Hence, the present study makes an attempt to analyse the impact of farm technology on rice production in Madurai district, Tamil Nadu.

Review of Literature

Sharma (1964) assumes the level of development of agriculture through means of selected indicators like gross area irrigated, gross sown area, rainfall, cropping intensity. This study also assessed the level of development of each of these indicators, which can reflect broadly the potential level of agricultural development.

Dibakar Naik, Beura D. and Behera M.R. (1999) in their study to examine inter-district growth performance of agriculture and its impact of sustainability of agricultural production and food security in Orissa. For the purpose the growth area, production and productivity of principal grains have been analysed for three periods, viz., 1970-80, 1981-90 and 1990-1999. The Gross Domestic Product (GDP) has growh at the rate of 4.91 per cent growth rate of agricultural gross state domestic product during 1980-89. The growth rate of GSDP is 4.33 per cent during 1990-96.

But the growth of agricultural gross state domestic product reduced to 0.47 per cent during 1990-96 due to poor performance of agriculture in the state. The poor performance of agriculture indicates wide gap between farmers practical and scientific knowledge available in the state.

Khanna S.S and Gupta M.P. (1988) have made in depth study into making the prospects of pulse production brighter in their analysis, “Raising Production of Pulses”. Moreover, the area, production and productivity of pulses have remained almost static during the last thirty years. Therefore, the authors feel that there is a great need for vigorously implementing the pulses development project to keep pace with the growing demand for pulses. They point out the present per capita pulses availability in India is much below the minimum pulse requirement as recommended by world Health Organization.

World Food Problems

World food problems involve complex interactions among food production, population growth, poverty, environmental effects, economic and political systems, and ethics. Producing food at a faster rate than population grows will not solve hunger problems unless the poor have enough land to grow their own food or enough income to buy the food they need. Chronic hunger and catastrophic failure are due to lack of access to food, but not a lack of food, 16th October is declared as the World Food Day. Global food production has increased substantially over the past two decades, but producing food and other agricultural products by conventional means uses more soil, water, plant, animal and energy resources, and causes more pollution and environmental damage, then any other human activity. To feed the 8.5 billion people projected by 2025, we must produce and equitably distribute as much food during the next 20 years as was produced since agriculture began about 10,000 years ago.

Objectives Of The Study

1. To analyse the cost and return structure of rice production under different classes of farmers in selected district.

2. To suggest the various suitable measures to improve rice production in different types of farmers.

Materials and Method

The present study is focused on both primary data and secondary data. The primary data is based on multi-stage random sampling method. The first stage, Madurai district has been selected in Tamil Nadu state. In secondly, two taluks are randomly chosen in selected district viz., Thirumangalam and Usilampatti. In view of these two taluks, six villages are selected in third
stage. In view of this Thirumangalam taluk, Urappanur, Cheekanurani and Vagaikulam villages have been selected. Besides, Pappapatti, Valandhur, and Karumathur villages have been selected in Usilampatti taluk. At fourth stage, 125 farmers are interviewed in selected villages. Among the selection of 125 farmers households, 72 farm households are belongs to small farmers and the remaining 53 farmers are selected to large farmers. In addition to primary data, the secondary data collected from various journals, newspapers and internet. Further, the data collection period is covered from the agricultural year in 2017-18. In order to analyse the compare cost and return structure of rice production, average and percentage analysis have been employed.

**Table -1: Per Acre Cost And Return Structure Of Rice Production**

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>Small Farmers</th>
<th>Large Farmers</th>
<th>Overall Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human labour (including family labour)</td>
<td>4,465.16</td>
<td>4,516.21</td>
<td>4,516.21</td>
</tr>
<tr>
<td>Bullock labour</td>
<td>1,421.36</td>
<td>1,316.15</td>
<td>1,321.15</td>
</tr>
<tr>
<td>Chemical fertilizer</td>
<td>1,626.13</td>
<td>1,621.36</td>
<td>1,641.13</td>
</tr>
<tr>
<td>Pesticide cost</td>
<td>621.22</td>
<td>639.14</td>
<td>610.66</td>
</tr>
<tr>
<td>Seed cost</td>
<td>672.16</td>
<td>611.21</td>
<td>531.12</td>
</tr>
<tr>
<td>Farm manure</td>
<td>693.14</td>
<td>699.14</td>
<td>766.10</td>
</tr>
<tr>
<td>Cost of irrigation</td>
<td>399.65</td>
<td>391.25</td>
<td>361.11</td>
</tr>
<tr>
<td>Interest on working capital</td>
<td>691.22</td>
<td>641.14</td>
<td>609.13</td>
</tr>
<tr>
<td>Rent</td>
<td>10,590.04</td>
<td>10,435.81</td>
<td>10,356.61</td>
</tr>
<tr>
<td>Interest as fixed capital (excluding land cost) land revenue, less and taxes, depreciation of implements and machinery</td>
<td>619.13</td>
<td>661.26</td>
<td>609.15</td>
</tr>
<tr>
<td>Total – Cost C (total)</td>
<td>12,200.41</td>
<td>12,053.28</td>
<td>11,973.91</td>
</tr>
<tr>
<td>Yield per acre in kg</td>
<td>2,466.36</td>
<td>2,241.41</td>
<td>2,316.41</td>
</tr>
<tr>
<td>Gross Returns (Rs.)</td>
<td>16,961.22</td>
<td>16,999.26</td>
<td>16,361.15</td>
</tr>
<tr>
<td>Net Returns (Rs.)</td>
<td>4,760.81</td>
<td>4,945.98</td>
<td>4,387.24</td>
</tr>
</tbody>
</table>

Source: Survey data.

Table 1 portrait per acre cost and return structure of rice cultivation in selected region. It is spelt out that, the whole farmers were spent overall amount at Rs 11,973.91. It records that the farmers spent more amount for human labour and chemical fertilizer cost at Rs 4516.21 and Rs 1641.13 respectively. Followed by the farmers spent on bullock labour cost at Rs 1321.15, rent at Rs 1008.15, farm manure at Rs 766.10, pesticide cost at Rs 610.66, interest on working capital at Rs 609.13, seed cost at Rs 531.12 and the cost of irrigation at Rs 361.11. As a result found that the farmers took yield per acre at 2316.41 Kg. Moreover in the form of gross return at Rs 16361.15 and net return at Rs 4387.24 in per acre cultivation of rice production in overall farmers.

As a comparative between the small scale farmers and the large scale farmers, the small farm household respondents are spent more amount for per acre cultivation of rice production at Rs 12200.41 and the large farmers spent only at Rs 12053.28. The result found that the small farmers took huge turnover of per acre rice cultivation at 2466.36 Kg as compared to large farmers at 2241.41 Kg.
Table-2: Cost components under different classification of farmers

<table>
<thead>
<tr>
<th>Cost Component</th>
<th>Small Farmers</th>
<th>Large Farmers</th>
<th>Overall Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human labour (including family labour)</td>
<td>38.16</td>
<td>38.61</td>
<td>38.46</td>
</tr>
<tr>
<td>Bullock labour</td>
<td>10.15</td>
<td>9.96</td>
<td>11.54</td>
</tr>
<tr>
<td>Chemical fertilizer</td>
<td>12.69</td>
<td>12.15</td>
<td>12.36</td>
</tr>
<tr>
<td>Pesticide cost</td>
<td>6.21</td>
<td>5.86</td>
<td>6.21</td>
</tr>
<tr>
<td>Seed cost</td>
<td>5.41</td>
<td>5.66</td>
<td>5.14</td>
</tr>
<tr>
<td>Farm manure</td>
<td>6.99</td>
<td>6.29</td>
<td>6.61</td>
</tr>
<tr>
<td>Cost of irrigation</td>
<td>2.98</td>
<td>3.99</td>
<td>4.01</td>
</tr>
<tr>
<td>Interest on working capital</td>
<td>6.98</td>
<td>5.99</td>
<td>5.16</td>
</tr>
<tr>
<td>Cost A</td>
<td>89.57</td>
<td>89.15</td>
<td>89.49</td>
</tr>
<tr>
<td>Rent</td>
<td>6.25</td>
<td>6.61</td>
<td>4.36</td>
</tr>
<tr>
<td>Interest as fixed capital (excluding land cost) land revenue, less and taxes, depreciation of implements and machinery</td>
<td>4.18</td>
<td>4.24</td>
<td>6.15</td>
</tr>
<tr>
<td><strong>Cost C (Total)</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source: Survey data.

Table-2 reveals that the percentage cost of variable inputs (Cost A) to total cost (Cost C) at 89.57 per cent for small farmers, 89.15 per cent for large farmers and 89.49 for overall farmers. In Cost A, human labour cost was found to be high for small, large and overall farmers at 38.16 per cent, 38.61 per cent and 38.46 per cent respectively followed by cost of chemical fertilizers. The small farmers spent 12.69 per cent of their total cost on the utilization of chemical fertilizer while large farms and overall farms spent 12.15 per cent and 12.36 per cent respectively. Next to this the major cost component was cost of bullock labour which constituted 10.15 per cent, 9.96 per cent and 11.54 per cent of the total cost for small, large and overall farmers respectively. Cost of pesticides worked out to 6.21 per cent for the small farmer, while it was 5.86 per cent and 6.21 per cent for large farmers and all farmers respectively. Farm manure constituted 6.99 per cent, 6.29 per cent and 6.61 per cent for small, large and overall farmers respectively. The rent for land was higher for large farmers than in the case of small farmer. It accounted for 6.25 per cent and 6.61 per cent for small farmers and large farmers. Interest as farm assets, depreciation of implements and machinery involved 4.18 per cent of the total cost for small farmer and 4.24 per cent of the total cost for large farmers.

Table-3: Technical bias in high yielding variety (HYV) of rice cultivation

<table>
<thead>
<tr>
<th>Cultivation</th>
<th>Factor</th>
<th>Proportionate Change in Output Elasticity</th>
<th>Nature of Technical Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYV</td>
<td>Human labour</td>
<td>0.0144</td>
<td>Human Labour using</td>
</tr>
<tr>
<td></td>
<td>Bullock Labour</td>
<td>-0.0096</td>
<td>Fertilizer saving</td>
</tr>
<tr>
<td></td>
<td>Fertilizer</td>
<td>-0.0136</td>
<td>Pesticides saving</td>
</tr>
<tr>
<td></td>
<td>Pesticides</td>
<td>0.0086</td>
<td>Bullock Pair using</td>
</tr>
<tr>
<td></td>
<td>Land</td>
<td>0.0244</td>
<td>Land Using</td>
</tr>
<tr>
<td></td>
<td>Capital</td>
<td>-0.0233</td>
<td>Capital Saving</td>
</tr>
</tbody>
</table>

Source: Sample Survey
Table-3 reveals that HYV of rice cultivation is biased in favor of human labour, pesticides and land and it against for bullock labour, fertilizer and capital. This shows the need for intensive use of human labour, pesticides and land rather than fertilizer and other variable inputs in the HYV of rice cultivation. Thus, the cultivation of HYV of rice leads to a considerable using a labour in the study area. The HYV of rice cultivation reduces the problem of unemployment in the agricultural sector, particularly in the study area.

**Suggestions**

1. The farmers in the study area were of the opinion that they could not achieve the maximum yield due to severity of diseases and pest attacks. It is suggested that the farmers should be educated property to apply the pesticides at the prescribed level and this may be done through the agricultural department officer attached to the panchayat unions.

2. Non-availability of credit was the other constraint. It is suggested that financial institutions should revitalize and revamp the existing credit facilities in the study area so that the farmers could get timely credit for undertaking improved cultivation practices.

3. Such measures shall certainly pave the way for the farmer’s greater success.

4. The marketing cost constitutes a major portion of the consumer price. Hence, Government should encourage the farmers to start co-operative societies in the study area in order to develop a direct link between the wholesalers/retailers, processors and exporters to cut down the marketing cost incurred for lengthy channel.

**Conclusion**

Thus, it is concluded from the analysis that small farmers are economically more efficient than large farmers irrespective of varieties of rice cultivation in the study area. This could be due to the better supervision and more efficient farm management favored by the smaller size of operational holdings. This indicated that apart from efficient allocation of inputs, direct supervision and farm management are crucial determinants of economic efficiency.

**Ethical Clearance:** Completed

**Source of Funding:** Self

**Conflict of Interest :** Nil

**References**

A System Dynamics Approach to Understand Respiratory Health Risk in Rural Population

Snehlata Tigala¹, Anu Rani Sharma², Kamna Sachdeva³
¹PhD Scholar, ²Assistant Professor, Department of Natural Resources, ³Associate Professor, Department of Energy and Environment, TERI School of Advanced Studies, New Delhi, India

Abstract

Indoor air pollution poses innumerable challenges and risks to the health of the exposed population. A cross-sectional study was conducted to assess the respiratory health of the rural population belonging to different socioeconomic strata. To estimate the extent of respiratory diseases prevalent in the rural population, factors that link exposure to health were identified and significance of each of these confounding factors on the health of the exposed were determined. A system dynamics approach was used to evaluate environment-user-health system based on the interrelationships that exist between different system variables. Higher odds of occurrence of chest illness were found in biomass users along with low-literacy and low-income groups, which limited their capacity to purchase clean fuel. Also, tobacco smokers were also at a higher risk of developing respiratory disease. The estimates generated from the study can be used to suggest and weight indicators responsible for health vulnerability.

Keywords: Biomass Combustion, Respiratory Health, Health Risk, System Dynamics

Introduction

According to WHO, every year globally, approximately 3.5 million deaths result from exposure to biomass burning smoke.¹⁻² Exposure to indoor air pollution due to combustion of traditional biomass fuels is a significant cause of various cardiorespiratory diseases among rural population in developing countries.³⁻⁴ Women are exposed to colossal risk due to use of unclean biomass fuel for the purpose of cooking and heating which, in turn, increases their vulnerability to various respiratory disorders.⁵⁻⁶

Documental evidence of an increase in illnesses and mortality due to elevated levels of ambient and indoor particulate air pollution is available.⁷ Suspended particulate matter varies in size depending on the source and deposits in the respiratory airways differently.⁸⁻⁹ Several factors determine the extent of impact of particulate matter on the human health; among such factors, socioeconomic, epidemiological and environmental are imperative to understand health risks and impacts. The synergistic effect of exposure is surrounded by uncertainties and therefore require precise mechanisms to associate health risks with exposure.

The present study, bridges the gap between exposure (through multiple sources) and health outcome in a heterogeneous population. A system dynamics approach has been used to understand linkages among the health risk determinants. After contemplation, a framework was designed to create an inventory of exposure sources and risk factors associated with the respiratory health of the subject population.

Method

A framework has been designed and established with scientific tools and understanding to assess the influence of differential exposure to air pollution and socioeconomic factors on the health of the rural population of Palanpur village using perception-based
surveys (Figure 1).

**Study Area**

The study has been conducted in Palanpur village, Karauli, Rajasthan (26°33’ N, 77°05’ E) which is in the northern part of western peninsular India. It is a medium sized village with a population of 1947 individuals, of which 876 are females while 1071 are males. The literacy varies greatly among men and women. The work force comprises of 963 individuals. People engaged in main work or employed for more than six months are 85.64%, while 14.54% are marginally employed, earning livelihood for less than six months. Most daily laborers are involved in mining due to proximity to the mining site (2.1 Km from the village).

**Sampling Design**

A primary survey was carried out at two different levels, viz, village and individual; during the pre-monsoon season (Figure 1). The village level survey was a focus group discussion with the representatives of the village including the Sarpanch (village head). This was done to get a glimpse of the conditions prevalent in the village and about any ongoing development. The individual level survey comprised of a structured questionnaire to analyze socio-economic setup and air quality perception. During the air quality assessment survey, questions related to air quality were asked to evaluate people’s perception about the pollution source(s), its contribution and seasonal variation. The socio-economic questionnaire assessed the population characteristics like sex ratio, literacy, occupation, income, cooking and housing characteristics. Simultaneously, personal interviews were carried out to assess the health of the subjects. For health assessment, the British Medical Research Council questionnaire for respiratory symptoms (1986, UK) was used. Further, the identification of diseases is based on the combination of these assorted symptoms. Stratified random sampling was performed on the basis of distinctive fuel type usage (LPG/Biomass) and occupation (Miners/Non-miners) in the sampled population. A total of 291 personal interviews were carried out. In case of an absentee individual, household representative was interviewed as proxy. No medical tests were performed on the sampled population during the course of this study. The study used various statistical tools and techniques to contemplate the relationship between health and socioeconomic variables, thus, to understand the dynamic complexity of the environment-user-health system (Figure 2).

**Results**

**Perception Based Surveys**

The air quality assessment survey revealed that the perception of ambient air quality in the region was poor due to extensive mining activities in the vicinity (aerial distance of the village from mining site is 2.1 Km). The indoor air quality was reported to be deteriorating due to biomass combustion. At household level, firewood/crop residue/dung cakes, etc were burnt on a day-to-day basis, during meal cooking for the household members. The respondents observed that there were both annual and seasonal variations in the air quality as the requirement for heating during winters escalates the use of biomass. Despite the bad influence of poor air quality on the health of the individuals, 89.7% people did not take any precautions to prevent/reduce exposure on everyday basis. Most individuals were oblivious to the pernicious effects of prolonged exposure.

In a typical household, on an average, a woman spent 1.8 hours in a day cooking in the kitchen, 1.6 hours per trip to collect fuel and 1.2 hours per trip to extract water. Moreover, the average distance travelled to collect fuel was around 1.5 km which further added to the drudgery of the women involved in the collection and transportation of heavy loads of fuelwood. The major fuel requirement was fulfilled by collecting tree branches from nearby farms. Seasonally available crop branches was also used as cook fuel for traditional cookstoves.

About 49.5% of the households did not use LPG for cooking purposes; while the rest of the 50.5% households had LPG connections, but had no means to buy refill cylinders. Additionally, under the below poverty line scheme, a few selected households were given LPG connections at subsidised rate. However, after using the provided cylinders, none of the households bought refill cylinders pertaining to budget constraints. Further, the annual income varied greatly within different occupational groups. Annual expenditure on health was constrained due to lower income pertaining to occupational limitation. Expenditure usually increased in households with disabled individuals or members having diseases that required regular medical assistance. A study by Duflo et al. (2008) on similar context elaborates on the vicious cycle called ‘poverty trap’, where, an
individual in poor health has limited opportunities to carry out work and hence, the household remains both in poverty and poor health.\[15\]

The health assessment survey (BMRC) evaluated the respiratory health of the subjects. Symptoms such as cough and phlegm were found to be more prevalent than breathlessness and wheezing. Level of breathlessness varied during different activities like hurrying on ground level or walking up slight hill, walking with similar aged individuals, etc. In some of the reported cases, chest condition was egregious; inhibiting the capacity of the individuals to carry out day-to-day activities. Subsequently, this debilitated state ranged from a week and extended up to three years in some severe cases. Among these, 65.3% had no history of chest illness. Also, tobacco smoking was one of the contributing factors for the presence of chest illness. Almost, one-third of the population smoked tobacco regularly. Cases of Pulmonary Tuberculosis (5.8%) and Bronchial Asthma (3.8%) were also reported.

Relationship between Respiratory Health and Risk Determinants

Our study is based on documented work, where, interpretation of disease is based upon symptom variables. Factor analysis revealed aggregation of different symptoms (cough, phlegm, wheezing and breathlessness) onto different components (1, 2). This stipulates that both the components had different causes, since they resolved separately (Table 1). Findings are indicative of bronchitis and asthma in the exposed population. However, the other underlying causes might lead to exhibition of symptoms similar to COPD subjects. Simultaneously, associations between the occurrence of chest illness and various socio-economic indicators (gender, education, primary occupation, annual income and health expenditure) have been found based on factor analysis (Table 3). Additionally, the odds of occurrence of chest illness in tobacco smokers was 3.4 times greater than that of non-smokers. Similarly, the odds of presence of chest illness in biomass-users was 1.9 times greater than that of LPG users. Binary logistic regression analysis (at CI=95%) showed a statistically significant relationship between tobacco smoking and chest illness (p<0.001); fuel type and chest illness (p<0.01); gender and chest illness (p<0.05) (Table 2).

The application of system dynamics approach in the field of environmental exposure and human health risk is done to understand the dynamic complexity of the environmental-user-health system. It elucidates the causal relation of various indicators and health risk. Figure 2 illustrates the relationship between air quality, social, economic and epidemiologic components. The factors that aggravate the risk to health include exposure sources and ignorance. Further, the impact on health is exacerbated by poor health care facilities, occurrence of chest illness among the exposed, ‘poverty trap’, and other risk factors.

Discussion

The study highlights the health vulnerability of the rural population in the context of the prevailing air quality and socio-economic factors. The impact of poor air quality varied from as minor as a sore throat or cough to as severe as a major chest illness among the subjects. Findings suggest that social stratification also plays an integral role towards the health vulnerability of the population. Susceptibility varied across gender, education and income group. Consequently, an association between education and occupation proved the increased susceptibility in lower literacy group. Occupation is highly dependent on education, which in turn also directs the annual income and expenditure. The lower literacy group was found to be prone due to lower wages and inability to purchase exorbitant clean fuel. The women were additionally exposed to incremental risk due to prolonged exposure to biomass burning smoke in a poorly ventilated kitchen. Subsequently, upper chest respiratory disorders were found to be more prevalent among biomass fuel users.

Investigations through cause-effect interface revealed that respiratory health of individuals is dependent on socio-economic parameters as well as on the air quality. Individually and in totality, these factors modulate the exposure source and its duration.

Conclusion

An approach has been used through guided selection of indicators; to explore and establish a relationship between environmental parameters and respiratory ailments (and convalescence), taking into consideration the socio-economic factors. Normalization and aggregation of these indicators can help to create health vulnerability indices to generate meaningful policies for proletarians. The key challenges to ameliorate
the health status in a heterogeneous population are plausibly education and income. The given framework can be used as a tool to assess health risks based on the stochastic relationship between various socio-economic determinants, environmental parameters and physiological factors to establish inter-linkages.

Table 1: Factor analysis of different respiratory symptoms to establish prevalence of chest illness in the sample population based on personal interviews.

<table>
<thead>
<tr>
<th></th>
<th>Component 1</th>
<th>Component 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phlegm</td>
<td>0.822</td>
<td>0.074</td>
</tr>
<tr>
<td>Wheezing</td>
<td>0.769</td>
<td>0.134</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>0.222</td>
<td>0.861</td>
</tr>
<tr>
<td>Cough</td>
<td>0.557</td>
<td>-0.635</td>
</tr>
</tbody>
</table>

Extraction method: Principal Component Analysis; Rotation Method: Oblimin with Kaiser Normalization; Rotation converged in 5 iterations; Values equal to or above 0.50 are considered.

Table 2: Results of binary logistic regression of selected criteria variables in influencing chest illness (at 95% CI).

<table>
<thead>
<tr>
<th></th>
<th>S.E.</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>0.381</td>
<td>1</td>
<td>0.028</td>
</tr>
<tr>
<td>Fuel Type</td>
<td>0.269</td>
<td>1</td>
<td>0.002</td>
</tr>
<tr>
<td>Tobacco Smoking</td>
<td>0.309</td>
<td>1</td>
<td>0.000</td>
</tr>
<tr>
<td>Mining</td>
<td>0.403</td>
<td>1</td>
<td>0.297</td>
</tr>
</tbody>
</table>

S.E = Standard Error, df = degree of freedom, Sig. = Significance at 95% confidence level

Table 3: Factor analysis of presence of chest illness in response to given socio-economic indicators to establish inter-linkages.

<table>
<thead>
<tr>
<th></th>
<th>Component 1</th>
<th>Component 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>-0.882</td>
<td>-0.018</td>
</tr>
<tr>
<td>Primary Occupation</td>
<td>0.837</td>
<td>-0.009</td>
</tr>
<tr>
<td>Education</td>
<td>0.629</td>
<td>-0.006</td>
</tr>
<tr>
<td>Annual Income</td>
<td>-0.029</td>
<td>0.865</td>
</tr>
<tr>
<td>Health Expenditure</td>
<td>0.029</td>
<td>0.863</td>
</tr>
</tbody>
</table>

Extraction method: Principal Component Analysis; Rotation Method: Oblimin with Kaiser Normalization; Rotation converged in 3 iterations; values equal to or above 0.50 are considered.

Figure 1: A conceptual framework designed to assess the influence of socio-economic determinants and air quality on the respiratory health of individuals.
Note: The (+) over the arrows implies positive relationship, but, it does not mean that the effect is necessarily constructive. Similarly, a (−) indicates an inverse relationship, but, not restricted to bad, as the case may be.

Conflict of Interest: This manuscript has not been published and is not under consideration for publication elsewhere. We know of no conflicts of interest associated with this publication. None of the authors have a financial relationship with a commercial entity that has an interest in the subject of this manuscript.

Source of Funding: We are grateful to the TERI School of Advanced Studies- Internal Grants Committee for providing financial support in conducting the study.

Ethical Clearance: The study is purely observational and non-invasive techniques have been used to collect the data. The Institute’s research committee (TERI School of Advanced Studies- Students’ Research Committee) reviewed and approved the protocol used in the study. Since, no harm or risk is posed to the study population, no further ethical approval is required. Subject’s involvement was based on consent; to participate and share the results of the assessment. Also, we have acknowledged the concerned people who contributed to this work.

References
5. Oxman AD, Muir DC, Shannon HS, Stock SR, Hnizdo E, Lange HJ. Occupational dust exposure and chronic obstructive pulmonary disease: a


8. Singh K, Tiwari S, Jha AK, Aggarwal SG, Bisht DS, Murty BP, Khan ZH, Gupta PK. Mass-size distribution of PM 10 and its characterization of ionic species in fine (PM 2.5) and coarse (PM 10−2.5) mode, New Delhi, India. Natural hazards. 2013 Sep 1;68(2):775-89.


10. Census of India (www.census2011.co.in) as accessed on 4 November 2017


Effectiveness of Lifestyle Modification for Grade I Hypertensive Individuals

Akshaya Ashok Lade1, Poovishnu Devi Thangavelu2, Vaishali Krishnat Jagtap3

1Intern, Faculty of Physiotherapy, Krishna University, Karad. Maharashtra, India, 2Cardio Respiratory Department, 3Musculoskeletal Department, Faculty of Physiotherapy, KIMSDU, Karad. Maharashtra, India

Abstract

Objective: To determine the effect of lifestyle modification on grade I hypertensive individuals.

Materials and Method: Ethical clearance was obtained from the Institutional Ethical Committee. 40 patients were selected for the study on the basis of inclusion and exclusion criteria. Demographic and baseline assessment were done on the first day. They are randomly allocated into two groups 20 in each group. Group A received conventional physiotherapy and Group B received lifestyle modification and conventional physiotherapy. Post test values were assessed after 3 months. The outcome measures are systolic (SBP), diastolic blood pressure (DBP) and heart rate (HR).

Result: Inter group statistical analysis for systolic blood pressure revealed significant in post intervention for group B (p=0.0372). Diastolic blood pressure was extremely significant for group B (P value<0.0001). Heart rate was very significant for group B (p=0.0008). While Post intervention analysis showed extremely significant difference between Group A and Group B (p<0.0001). Group B treated with lifestyle modification and conventional physiotherapy was extremely significant.

Conclusion: Exercises are effective in lowering the levels of systolic, diastolic blood pressure and heart rate. But exercises along with lifestyle modification is significantly more effective for grade I hypertensive individuals.

Keywords: Lifestyle modification, conventional physiotherapy, grade I hypertension.

Introduction

Hypertension is an elevated blood pressure1. High blood pressure is a risk factor for stroke, congestive heart failure, myocardial infarction, peripheral vascular disease and end stage renal disease2. Grade I hypertension that is systolic/diastolic (140/90mmHg) is measure modifiable risk factor for cardiovascular disease4.

Prevalence of hypertension is in one-quarter of the world population5. In India one-fifth of people have blood pressure >160/95mmHg and almost one-half have blood pressure >140/90mmHg4. In Maharashtra prevalence rate is 7.24%4. Hypertension was observed more in females as compared to male. Because menopause women are more prone to hypertension4. Hypertension awareness is problematic issue, only two-thirds of adults are aware of their hypertension status4.

Risk factors have been implicated in the development of hypertension such as diabetes mellitus, stress, family history, sedentary lifestyle, smoking, high intake of saturated fats and alcohol.

The renin is an enzyme secreted by the juxtaglomerular cell of the kidney and linked with Aldosterone in a negative feedback loop. The end product of the action of renin is peptide angiotensin II and adrenal cortex has an increased sensitivity to angiotensin II. The intake of normal or high sodium content, Aldosterone production will not suppressed, but it will lead to a mild degree of hyperaldosteronism with increased sodium retention, volume expansion and increased in blood pressure4.

Till now physiotherapy management for hypertension is not followed to a great extent. Only
daily walking is prescribed which is not followed by patients, stress is taken as a part of life, reduction of salt and regular intake of medications were not educated properly because of lack of guidelines and motivation among patients. so a structured protocol or adjunct therapy is needed for reduced of hypertension.

Lifestyle modification is recommended by Joint National Committee (JNC) VI TO implement first line treatment for up to 6 months the individuals with grade I hypertension. Lifestyle modification regarded as adjunctive therapy for those individuals taking antihypertensive medication. Lifestyle modification includes physician, nurse, behavior therapist, dietician, and physiotherapist.

Physician assesses the patient. Necessary investigation were done Physician analyses the Investigation reports, prescription of medicine was done and refer the patient to lifestyle modification clinic.

Nurse will educate about the normal values of BP, importance of regular intake of Hypertension to patient. And importance of regular intake of medicine is must in hypertensive individuals.

Behavior therapist will modify the personal habits like smoking, alcoholism, tobacco consumption and other types of addictions gradually and stop it, stress management, family counseling etc.

Dietary approach to stop hypertension (DASH) diet which involves the consumption of fruits, vegetables, low fat dairy products; which includes whole grains, poultry, fish, and nuts and it will increase the levels of potassium, magnesium, calcium, fibre and protein.

Regular physical activity has cardio protective effect. Regular exercise associated with increase in high-density lipoprotein and reduction insulin resistance. Regular exercise which include aerobic exercises and strengthening exercise. In Aerobic exercise includes brisk walk, walking, jogging. And in Strengthening program includes chest press, shoulder press, triceps extension, biceps curls, lower back extension, abdominal crunch/curl up, quadriceps extension or leg press, leg curls (hamstrings).

Lifestyle medication create an recommended lifestyle changes related to range of health benefits, and better outcomes of common chronic disease.

Method

It was experimental study conducted in physiotherapy department of Krishna institute of medical sciences. 40 patients were selected for the study by simple random sampling. Demographic and baseline assessments were done on the first day. The patients were selected according to inclusion and exclusion criteria. Inclusion criteria were as follows: 1. Age limit 40-55 yrs, 2. Blood pressure: 140-159/90-99 mmHg (grade I), 3. Normal kidney functions and hormonal functions, 4. Patients pliable with dieting, 5. Currently taking anti-hypertensive medication, 6. Patient who are compatible to perform exercises on regular basis, 7. Ability to provide informed consent. Exclusion criteria were as follows: 1. Family history of hypertension, 2. Symptomatic cardiovascular problems, 3. Severe headache, blurred vision, chest pain, difficulty in breathing, 4. Practicing any type of weight loss program, 5. Inability to provide informed consent. randomization was done in which Group A received only conventional physiotherapy will include only walking and Group B: Group B received lifestyle modification along with conventional physiotherapy will include physician (will prescribe antihypertensive medication), behavior management (progressive relaxation technique and cognitive behavioral therapy), diet (DASH Diet) plan, exercise regime (aerobic and strengthening exercises) and health education.

Outcome Measures

Systolic Blood Pressure

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Treatment</th>
<th>Post-treatment</th>
<th>‘P’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>142.8 ± 2.783</td>
<td>140 ± 2.902</td>
<td>0.8104</td>
</tr>
<tr>
<td>B</td>
<td>145.5 ± 4.850</td>
<td>140.3 ± 4.736</td>
<td>0.0372</td>
</tr>
</tbody>
</table>

In the present study pre interventional means of systolic blood pressure was 145.5 ± 4.850 in Group B and in 142.8 ± 2.783 Group A whereas post-interventional mean was 140.3 ± 4.736 for systolic blood pressure in Group B and in 140 ± 2.902 Group A respectively.
Inter group analysis of systolic blood pressure was done by using unpaired t test. Post intervention analysis showed significant difference between Group A and Group B (p=0.0372)

**DIASTOLIC BLOOD PRESSURE**

Table no 2: Comparison of pre and post diastolic blood pressure between groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-treatment Mean ± SD</th>
<th>Post-treatment Mean ± SD</th>
<th>‘P’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>91.4 ± 1.729</td>
<td>89.4 ± 1.603</td>
<td>0.3881</td>
</tr>
<tr>
<td>B</td>
<td>90.9 ± 1.889</td>
<td>85.7 ± 2.452</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

In the present study pre interventional means of diastolic blood pressure was 90.9 ± 1.889 in Group B and 91.4 ± 1.729 in Group A whereas post-interventional mean was 85.7 ± 2.452 for diastolic blood pressure in Group B and 89.4 ± 1.603 in Group A respectively.

Inter group analysis of diastolic blood pressure was done by using unpaired t test. Post intervention analysis showed extremely significant difference between Group A and Group B (p<0.0001)

**HEART RATE**

Table No 3. Comparison of pre and post heart rate between groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Treatment Mean ± SD</th>
<th>Post-treatment Mean ± SD</th>
<th>‘P’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>77.2 ± 1.642</td>
<td>74.95 ± 1.1317</td>
<td>0.4496</td>
</tr>
<tr>
<td>B</td>
<td>79 ± 1.487</td>
<td>74.6 ± 1.569</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

In the present study pre interventional means of heart rate was 79 ± 1.487 in Group B and 77.2 ± 1.642 in Group A whereas post-interventional mean was 74.6 ± 1.569 for heart rate in Group B and 74.95 ± 1.317 in Group A respectively.

Inter group analysis of heart rate was done by using unpaired t test. Post intervention analysis showed very significant difference between Group A and Group B (p=0.0008)

### Table no 4: Post-Post values of all outcome measures in between group A and group B

<table>
<thead>
<tr>
<th></th>
<th>MEAN ± SD</th>
<th>P-VALUE</th>
<th></th>
<th>MEAN ± SD</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>140 ± 2.902</td>
<td>0.0372</td>
<td>Group A</td>
<td>140.3 ± 4.736</td>
<td>0.0372</td>
</tr>
<tr>
<td>Group B</td>
<td>89.4 ± 1.603</td>
<td>&lt;0.0001</td>
<td>Group B</td>
<td>85.7 ± 2.452</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>HEART RATE</td>
<td>74.95±1.1317</td>
<td>0.0008</td>
<td>HEART RATE</td>
<td>74.6 ± 1.569</td>
<td>0.0008</td>
</tr>
</tbody>
</table>

**Figure 1: Comparison of pre and post systolic blood pressure between groups**

**Figure 2: Comparison of pre and post diastolic blood pressure between groups**

**Figure 3: Comparison of pre and post heart rate between groups**
Discussion

Hypertension is growing health problem in India with every third to fifth Indian as hypertensive. Prevalence of hypertension continues to increasing so, hypertension is becomes an important public health issue. Approximately 10% deaths occur in India because of high blood pressure.

In study has shown clinically significant changes in systolic blood pressure, diastolic blood pressure and heart rate. These findings suggest that lifestyle modification is effective in reducing in high blood pressure.

Lifestyle modifications includes regular physical exercise, salt restriction, moderation of alcohol consumption, high consumption of vegetables and fruits and low fat (DASH diet), cessation of smoking, stress management. Regular physical exercise is associated with an increase in high-density lipoprotein cholesterol and with reduction in insulin resistance, systemic vascular resistance, plasma noradrenalin, plasma renin activity and body weight. Individual with hypertension need to do exercise regularly it reduces the blood pressure by 4.9mmHg. Single episode of exercise is able to reduce levels of blood pressure.

High dietary salt intake associated with an increased incidence of stroke and cardiovascular diseases. Reducing salt intake approximately (75mmol) per day can lower 4 to 5mmHg systolic blood pressure and 2mmHg of diastolic blood pressure.

Reducing alcohol consumption can reduce systolic blood pressure 3.8mmHg patient with hypertension. Hypertensive individuals can limit their alcohol intake to a maximum two drinks per day for men, one drink per day for women.

Smoking is individual risk factor cardiovascular diseases. It causes immediate increase in blood pressure and heart rate that persist for more than 15 minutes after one cigarette. Smoking cessation is also reducing the complications and high blood pressure. But smoking cessation finds it very difficult by hypertensive individuals. They feel restless because of smoking cessation. In such cases behavioral management plays important role. Some individuals are obese they having difficulty in doing exercises on regular basis. DASH diet is also helpful in reduction of blood pressure. High dose of omega-3 polyunsaturated fatty acid supplement (fish oil) also lower blood pressure.

Group B was more significant as compared to group A, group A was not given diet, behavioral management for alteration in addiction and stress management. Group A individuals had no restrictions salt intake and additions. While group B was given lifestyle modification which included behavioral management, diet, and exercises.

Group A was less effective because it includes only conventional exercises no restriction on diet and behavioral management was not part of their protocol which conventional lack as compared to lifestyle modification.

The limitations of the study: 1. The study can be done in other areas of the country. 2. The study is done in Asian race. 3. The study is limited to a small sample size which makes it difficult to extrapolate the result. 4. This study is limited to age group 40-55 year. 5. This study was limited to shorter duration follow up period.

Suggestion and recommendation of the study: 1. This study should be conducted with large number of people. 2. This study can be done on longer duration with longer follow up period for the assessment of long term benefits.

Conclusion

Exercises are effective in lowering the levels of systolic, diastolic blood pressure and heart rate. But exercises along with life style modification as adjunctive therapy is significantly more effective for grade I hypertensive individuals.

Ethical Clearance- Taken from Krishna institute of medical sciences committee.

Source of Funding- Self

Conflicts of Interests: The authors declare that there is no conflict of interest concerning the content of the present study.

References

2. Singhal Swati, Sonia. Effects of aerobic versus


Growth Performance of Leather Industry in India

S Thangamayan¹, R Bharathi Rajan², B Chithirairajan¹

¹Assistant Professor, Department of Economics, ²Assistant Professor, Department of Commerce, VELS Institute of Science, Technology and Advanced Studies, (Deemed to be University), Pallavaram, Chennai

Abstract

In the 1980’s and the 1990’s the importance of leather industry stemmed from the fact that it was the sixth or seventh largest foreign exchange earner of the country. The focus of the government clearly is on generating inclusive growth and the nature of employment provided by the leather sector indeed meets this objective. Major problem faced by the industry is with regard to availability of developed industrial plots at affordable prices. There has been talk about developing exclusive leather industrial parks but unfortunately during the last plan period, not much progress could be made. The XI plan have also provided for the establishment of many leather parks. The leather industry growth has been sustained by the country’s large livestock population, which claims a unique position in the world, “estimated at 425 million cattle, buffaloes, sheep and goat.” (57 per cent made up of buffaloes, 16 per cent of cattle, 20 per cent of goat and 4 per cent of sheep population in the world). Liberal imports of raw materials, leather machines, chemicals and auxiliaries have been the major highlights of the new policy. The leather industry has faced many problems i.e., input of raw materials and environment management practices, water consumption and waste water consumption. But leather industry has shown negative growth rate through the manufacturing sector has recorded the highest positive growth rate after liberalization. This position has urged to the study and analyzes the Indian leather industry.

Keywords: Leather Industry, Growth Performance, Facing Problem

Introduction

The leather industry is one of the oldest traditional industries of our country. The industry has three distinct facts: Flaying of animals, renewal of hides and skins and their preservation and Utilization of other carcass components. Conversion of hides and skins into leather or tanning and Manufacture of foot wear and other leather goods.

In the 1980’s and the 1990’s the importance of leather industry stemmed from the fact that it was the sixth or seventh largest foreign exchange earner of the country. However, this situation has now changed drastically with many service and other industries overtaking the leather sector. The focus of the government clearly is on generating inclusive growth and the nature of employment provided by the leather sector indeed meets this objective. The plan targets the industry’s turnover to grow from the current $ 6 billion to $ 13.2 billion by 2011-12, with exports climbing up from about $ 3 billion to $ 7 billion annually in this period. Till one year back, the rising global trade in leather and leather products coupled with the big spurt in domestic demand, thanks to the burgeoning middle class, were the reasons for this optimism. But with the global meltdown and the consequent slowing down of economic activity in developed countries, the industry has to grapple with the immediate problems of a likely recession in 2009 and possibly some part of 2010.

Leather Parks

Major problem faced by the industry is with regard to availability of developed industrial plots at affordable prices. There has been talk about developing exclusive leather industrial parks but unfortunately during the last plan period, not much progress could be made. The XI plan have also provided for the establishment of many leather parks. Tamil Nadu is planning two footwear parks, one at Irungattukottai and another at Rani pet. All these industrial estates have to be taken up
on a war footing. Two large footwear factories, one at Tada in Andra Pradesh and another at Cheyyar in Tamil Nadu are already in operation. Their success may spur many others to make a beeline for India. Some gentle nudging from Indian industry bodies and commercial attaches may accelerate this process. In some parts of Tamil Nadu, the demand for skilled labour from other emerging industries has shot up resulting in a big jump in wage levels. There is need for vocational training on a large scale so that there will be continuous supply of labour at competitive wage levels.

Growth of Leather Industry in India

The leather industry growth has been sustained by the country’s large livestock population, which claims a unique position in the world, “estimated at 425 million cattle, buffaloes, sheep and goat.” (57 per cent made up of buffaloes, 16 per cent of cattle, 20 per cent of goat and 4 per cent of sheep population in the world). However, in view of the fact that livestock is increasing only at 1.2 per cent rate per annum, the available of in ingenious hides and skins has been almost stagnant. According to CLRT (Chennai), over Rs.3.3 crores worth of ovine skins are lost annually to non-flaying of carcasses. Thus in future the available of raw material is going to be one of the major constraints for the growth of leather sector. “Among the important centers of leather and leather products in India, Kanpur specializes in tanning and finishing of buffaloes and production of harness (safflery) and shoe leathers. In Calcutta, tanning and finishing of cow hides and processing of goatskins is a prime activity. Madras and several districts in Tamil Nadu specialize in finished leathers of various kinds”.2

Recent Trends in Leather Industry in India

The following are the recent changes taken place in leather industry in India:

Production in tiny and cottage sector is rapidly declining due to shift from traditional methods of production to factory – based production.

90 per cent of skins and 50 per cent of hides are obtained from slaughter leading to improvement in the quality on finished leather.

The state of the art technology in the leather product sector is commendable due to liberalization in import policy.

Female worker content in footwear and leather products sector has been increasing.

There has been an improved image for the Indian leather products in the international market.

A market increase for technical manpower and skilled labour to cope with export needs is perceived.

Dependence on imported hides and skins is growing significantly.

There has been increasing awareness of the treatments of effluents.

Development of Leather Product Sector in India

During the significant policy shift in 1991 towards globalization of Indian economy, except the duty drawback, the other export incentives for leather products were withdrawn. However restriction on the exports of finished leathers with 5 per cent duty along with ISI norms was introduced. Liberal imports of raw materials, leather machines, chemicals and auxiliaries have been the major highlights of the new policy. The essence of the current liberal policy signifies restriction of a new item of exports and import. With large raw material reserves, access to low cost labour and management, as well as the encouraging support from the government, the factory sector of the product industry made rapid growth in the production and export of leather products. The governments industrial and trade policies, institutional support, coupled with aggressive entrepreneurship and growing demand for exports have been the other factors contributing to its growth. Apart from tanners setting up product units, leading companies like Wipro, Ponds India, MRF, Hindustan Lever etc., also set up product units with 100 per cent export orientation. Some of them entered into technical and marketing tie-ups with reputed overseas companies setting up of such modern product units opened new avenues to technology, machine operations, skilled and unskilled workers.

Statement of the Problem

In 1991, the major reform process started the initiation of the industrial growth and it was regulated by the states through the industrial licensing system for the establishment of new industries and capacity expansion of old industries. The public sector played a major role in capital formation and the government owned and operated many industries. Domestic industries were
protected through quotas and higher tariffs for more products. The foreign exchange rate was fixed by the administrative decision. The central government has unlimited access to borrowing from the Reserve Bank of India. The above-mentioned system was dismantled and more market friendly economic system was introduced in July 1991.  

The 1991’s liberalization policy provided free access to capital technology and market in order to induce greater industrial efficiency and international competitiveness. The policy seeds to free the Indian industries from excessive government regulations and control so as to allow freedom and flexibility in business decisions and for responding for market forces. The policy initiatives have focused on the basic orientation of industries to benchmark it against the global standards.  

**Objectives of the Study**

1. To analyze the growth of leather industry in India.
2. To analyze the productivity performance of leather industry in India during the study period
3. To discuss the general problems of leather industry in India.

**Table - 1: Shares of India's leather and leather products exports to total leather products exports, leather exports (US $ million)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Semi finished leather</th>
<th>Finished leather</th>
<th>Leather footwear</th>
<th>Footwear components</th>
<th>Leather Garments</th>
<th>Leather Goods</th>
<th>Saddlery &amp; Harness</th>
<th>Leather gloves</th>
<th>Non leather</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982-83</td>
<td>13.62</td>
<td>50.05</td>
<td>4.90</td>
<td>19.86</td>
<td>1.86</td>
<td>9.70</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1983-84</td>
<td>121.97</td>
<td>45.99</td>
<td>5.27</td>
<td>25.49</td>
<td>1.56</td>
<td>9.72</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1984-85</td>
<td>8.42</td>
<td>52.85</td>
<td>4.59</td>
<td>22.75</td>
<td>1.62</td>
<td>9.77</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1985-86</td>
<td>7.41</td>
<td>43.50</td>
<td>4.99</td>
<td>28.73</td>
<td>2.52</td>
<td>12.85</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1986-87</td>
<td>5.63</td>
<td>42.97</td>
<td>8.62</td>
<td>25.80</td>
<td>6.67</td>
<td>10.31</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1987-88</td>
<td>5.83</td>
<td>39.04</td>
<td>10.28</td>
<td>26.01</td>
<td>8.49</td>
<td>10.34</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1988-89</td>
<td>2.81</td>
<td>40.64</td>
<td>8.14</td>
<td>26.03</td>
<td>10.39</td>
<td>11.98</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1989-90</td>
<td>1.04</td>
<td>34.16</td>
<td>8.45</td>
<td>25.53</td>
<td>16.40</td>
<td>14.43</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1990-91</td>
<td>0.48</td>
<td>30.92</td>
<td>10.98</td>
<td>22.43</td>
<td>21.76</td>
<td>13.43</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1991-92</td>
<td>0.00</td>
<td>23.61</td>
<td>14.00</td>
<td>21.56</td>
<td>23.95</td>
<td>16.87</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1992-93</td>
<td>0.00</td>
<td>21.75</td>
<td>12.73</td>
<td>19.07</td>
<td>25.24</td>
<td>20.24</td>
<td>0.00</td>
<td>0.00</td>
<td>0.98</td>
</tr>
<tr>
<td>1993-94</td>
<td>0.00</td>
<td>20.17</td>
<td>15.25</td>
<td>18.92</td>
<td>25.55</td>
<td>17.11</td>
<td>0.00</td>
<td>0.00</td>
<td>3.00</td>
</tr>
<tr>
<td>1994-95</td>
<td>0.00</td>
<td>25.09</td>
<td>19.82</td>
<td>16.22</td>
<td>25.37</td>
<td>7.13</td>
<td>1.21</td>
<td>0.00</td>
<td>0.92</td>
</tr>
<tr>
<td>1995-96</td>
<td>0.00</td>
<td>21.06</td>
<td>19.31</td>
<td>13.78</td>
<td>23.46</td>
<td>16.10</td>
<td>1.21</td>
<td>4.24</td>
<td>0.60</td>
</tr>
<tr>
<td>1996-97</td>
<td>0.00</td>
<td>18.60</td>
<td>20.85</td>
<td>13.76</td>
<td>26.22</td>
<td>13.93</td>
<td>1.60</td>
<td>4.47</td>
<td>0.77</td>
</tr>
<tr>
<td>1997-98</td>
<td>0.00</td>
<td>17.69</td>
<td>16.86</td>
<td>14.38</td>
<td>25.43</td>
<td>18.05</td>
<td>1.55</td>
<td>4.25</td>
<td>0.91</td>
</tr>
<tr>
<td>1998-99</td>
<td>0.00</td>
<td>15.99</td>
<td>19.35</td>
<td>14.36</td>
<td>22.76</td>
<td>18.80</td>
<td>1.98</td>
<td>5.12</td>
<td>1.06</td>
</tr>
<tr>
<td>1999-00</td>
<td>0.00</td>
<td>14.95</td>
<td>23.52</td>
<td>13.41</td>
<td>21.65</td>
<td>17.37</td>
<td>2.13</td>
<td>5.61</td>
<td>0.88</td>
</tr>
<tr>
<td>2000-01</td>
<td>0.00</td>
<td>19.43</td>
<td>19.42</td>
<td>12.13</td>
<td>23.45</td>
<td>17.51</td>
<td>2.17</td>
<td>6.10</td>
<td>0.97</td>
</tr>
<tr>
<td>2001-02</td>
<td>0.00</td>
<td>23.72</td>
<td>20.42</td>
<td>12.08</td>
<td>19.56</td>
<td>16.61</td>
<td>1.84</td>
<td>4.92</td>
<td>1.34</td>
</tr>
<tr>
<td>2002-03</td>
<td>0.00</td>
<td>27.13</td>
<td>22.57</td>
<td>9.34</td>
<td>14.51</td>
<td>17.88</td>
<td>2.33</td>
<td>4.43</td>
<td>1.43</td>
</tr>
<tr>
<td>2003-04</td>
<td>0.00</td>
<td>25.07</td>
<td>24.95</td>
<td>7.28</td>
<td>13.58</td>
<td>18.19</td>
<td>2.38</td>
<td>4.80</td>
<td>2.41</td>
</tr>
<tr>
<td>2004-05</td>
<td>0.00</td>
<td>24.25</td>
<td>25.29</td>
<td>6.88</td>
<td>13.40</td>
<td>23.89</td>
<td>2.51</td>
<td>6.14</td>
<td>3.79</td>
</tr>
<tr>
<td>2005-06</td>
<td>0.00</td>
<td>26.04</td>
<td>25.98</td>
<td>5.23</td>
<td>14.23</td>
<td>27.01</td>
<td>2.78</td>
<td>5.19</td>
<td>4.02</td>
</tr>
<tr>
<td>2006-07</td>
<td>0.00</td>
<td>27.14</td>
<td>27.19</td>
<td>6.04</td>
<td>17.57</td>
<td>29.13</td>
<td>2.91</td>
<td>6.74</td>
<td>5.74</td>
</tr>
</tbody>
</table>

Source: http://www.leatherindia.org
Table - 2: India’s country-wise export of leather and leather products (in US $ million)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>U.S.A.</td>
<td>286.89</td>
<td>246.44</td>
<td>251.58</td>
<td>279.70</td>
<td>281.89</td>
</tr>
<tr>
<td>2.</td>
<td>Germani</td>
<td>304.46</td>
<td>272.53</td>
<td>329.82</td>
<td>336.69</td>
<td>339.23</td>
</tr>
<tr>
<td>3.</td>
<td>UK</td>
<td>248.89</td>
<td>240.96</td>
<td>250.65</td>
<td>299.21</td>
<td>321.32</td>
</tr>
<tr>
<td>4.</td>
<td>Italy</td>
<td>263.11</td>
<td>255.92</td>
<td>285.02</td>
<td>242.60</td>
<td>264.41</td>
</tr>
<tr>
<td>5.</td>
<td>Spain</td>
<td>101.30</td>
<td>110.56</td>
<td>161.23</td>
<td>169.21</td>
<td>172.37</td>
</tr>
<tr>
<td>6.</td>
<td>Hong Kong</td>
<td>121.43</td>
<td>165.70</td>
<td>226.97</td>
<td>236.52</td>
<td>242.44</td>
</tr>
<tr>
<td>7.</td>
<td>France</td>
<td>89.72</td>
<td>88.43</td>
<td>109.82</td>
<td>132.73</td>
<td>135.78</td>
</tr>
<tr>
<td>8.</td>
<td>Netherlands</td>
<td>60.50</td>
<td>50.95</td>
<td>57.75</td>
<td>63.32</td>
<td>66.47</td>
</tr>
<tr>
<td>9.</td>
<td>Portugal</td>
<td>37.00</td>
<td>34.75</td>
<td>34.07</td>
<td>36.23</td>
<td>39.32</td>
</tr>
<tr>
<td>10.</td>
<td>Russia</td>
<td>16.09</td>
<td>11.09</td>
<td>11.33</td>
<td>7.61</td>
<td>7.81</td>
</tr>
<tr>
<td>11.</td>
<td>Denmark</td>
<td>22.47</td>
<td>17.59</td>
<td>24.66</td>
<td>29.40</td>
<td>31.47</td>
</tr>
<tr>
<td>12.</td>
<td>Australia</td>
<td>27.07</td>
<td>30.31</td>
<td>32.03</td>
<td>34.78</td>
<td>36.71</td>
</tr>
<tr>
<td>13.</td>
<td>Canada</td>
<td>27.81</td>
<td>24.81</td>
<td>25.59</td>
<td>28.19</td>
<td>29.21</td>
</tr>
<tr>
<td>14.</td>
<td>Sweedan</td>
<td>19.91</td>
<td>17.78</td>
<td>19.61</td>
<td>22.10</td>
<td>25.51</td>
</tr>
<tr>
<td>15.</td>
<td>South Africa</td>
<td>19.53</td>
<td>16.91</td>
<td>20.64</td>
<td>20.85</td>
<td>22.91</td>
</tr>
<tr>
<td>16.</td>
<td>UAE</td>
<td>20.13</td>
<td>28.00</td>
<td>37.39</td>
<td>46.76</td>
<td>47.39</td>
</tr>
<tr>
<td>17.</td>
<td>Switzerland</td>
<td>16.92</td>
<td>13.92</td>
<td>16.64</td>
<td>17.25</td>
<td>19.21</td>
</tr>
<tr>
<td>18.</td>
<td>Belgium</td>
<td>21.08</td>
<td>19.53</td>
<td>24.24</td>
<td>32.66</td>
<td>34.23</td>
</tr>
<tr>
<td>19.</td>
<td>Korea</td>
<td>27.04</td>
<td>27.64</td>
<td>25.47</td>
<td>29.60</td>
<td>30.65</td>
</tr>
<tr>
<td>20.</td>
<td>Austria</td>
<td>16.42</td>
<td>13.78</td>
<td>19.12</td>
<td>20.22</td>
<td>22.43</td>
</tr>
<tr>
<td>22.</td>
<td>Saudi Arabia</td>
<td>9.20</td>
<td>8.41</td>
<td>10.61</td>
<td>11.78</td>
<td>11.97</td>
</tr>
<tr>
<td>23.</td>
<td>China</td>
<td>13.86</td>
<td>16.57</td>
<td>22.87</td>
<td>32.59</td>
<td>33.62</td>
</tr>
<tr>
<td>25.</td>
<td>Ireland</td>
<td>2.89</td>
<td>3.84</td>
<td>4.08</td>
<td>5.56</td>
<td>6.69</td>
</tr>
<tr>
<td>26.</td>
<td>Finland</td>
<td>7.92</td>
<td>3.52</td>
<td>4.23</td>
<td>6.37</td>
<td>7.71</td>
</tr>
<tr>
<td>27.</td>
<td>New Zealand</td>
<td>3.39</td>
<td>3.37</td>
<td>4.22</td>
<td>2.89</td>
<td>3.63</td>
</tr>
<tr>
<td>28.</td>
<td>Indonesia</td>
<td>5.91</td>
<td>7.76</td>
<td>8.42</td>
<td>9.47</td>
<td>12.49</td>
</tr>
<tr>
<td>29.</td>
<td>Others</td>
<td>123.48</td>
<td>120.21</td>
<td>166.91</td>
<td>196.92</td>
<td>210.24</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1936.14</td>
<td>1875.21</td>
<td>2216.45</td>
<td>2379.40</td>
<td>2486.55</td>
</tr>
</tbody>
</table>

Source: http://www.leatherindia.org
**Result Discussion**

In 1991 major reforms process started in India. The 1991 liberalization policy provided free access of capital technology and market in order to induce greater industrial efficiency and international competitiveness. But leather industry has shown negative growth rate through the manufacturing sector has recorded the highest positive growth rate after liberalization. This position has urged the researcher to study and analyze the Indian leather industry.

**Exports**

India has now become an exporter of finished leathers, footwear’s and a variety of leather goods. India’s share in the world trade of leather is however, hardness about 16 percentage. This share of leather, manufacture in the country’s total exports has generally between 4 percentage and 6 percentage. The leather industry, one of India’s oldest industries has been growing fairly rapidly in recent years. The growth of the industry has been mainly qualitative in that processing of the basic raw materials is being taken to higher and higher stage with in the country itself. The qualitative charges are reflected in the produce pattern at the industry, which has changed from being predominantly weighted in favour of raw hides and skins in the early fifties in finished leather and leather goods oriented pattern at present. The large extent these represent the response of the industry to deliberate government policies rather a process of spontaneous growth. While the industry has been primarily export oriented in the future scope for the growth of market within the country will be freight in view at the likely improvements in the standard of living resulting from economic development.

**Problems of Leather Industry in India**

New tanneries in different parts of the country are mushrooming. This would result in lesser flow of hides and skins to India.

The movement from production of leather products is rather slow.

Trained technical personnel in the industry are not easily available.

The industry is affected by frequent power shortage and power cuts.

Persistent pressure to setup common effluent treatment plants by the government.

**Problems faced by the leather industry in India**

The leather industry has faced many problems i.e., input of raw materials and environment management practices, water consumption and waste water consumption. The government of India took several initiatives, including the banning of exports of raw hides and semi-processed hides and skins and liberalized the import of raw materials for the manufactures is reserved mostly for the small scale sector foreign collaboration is liberally allowed for modernization and value added export production.

**Suggestions**

**To the leather industry**

The industry should enhance its technology thereby increase the efficiency of capital than labour.

The capital should be used efficiently to increase the gross value added through efficient management.

The industry should increase the factor size through increase the capital than number of factories.

**To the government**

The factors that influence the productivity of leather industry vary for India.

Government has to help increase the capital requirements of leather industry in India.

Government has to evolve the supportive policies of the leather industry in terms of production and marketing.

**Conclusion**

Leather industry of India is a capital-intensive industry. Technology advancement happened in leather industry of India, but it was not efficiently utilized. The growth of total factor productivity was mainly because of growth in labour productivity. High level of capital in leather industry was not efficiently utilized particularly after the liberalization even it is in good position during the study period. Efficient utilization of labour and capital were attributed in leather industry after liberalization. The reason for the decreasing trend of productivity was due to steep fall in gross value added in the leather industry particularly after 1995-96. To develop the Indian
leather industry, there is need to be efficiently utilized to increase the gross value added. There is also the need to strengthen. Research and Development to increase the gross value added of Leather industry in India.

**Ethical Clearance:** Completed

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**

Effectiveness of Cabbage Leaves Application on Breast Engorgement: *Narrative Review*

Akanksha Yadav¹, Kavitha Mole PJ², Nageshwar V³
¹M.Sc.Nsg. 2nd Year Student, Department of Obstetric and Gynaecology, ²Professor, M.Sc. Nursing, M.Sc. Psychology PGDCP, Department of Obstetrics and Gynaecological Nursing, ³Assistant Professor, Ph.D., Department of Psychiatric Health Nursing, Teerthaker Mahaveer College of Nursing, TMU, Moradabad, U.P.

Abstract

Introduction: Engorged breast is a condition that influence lactating mothers early in the postpartum period. The discomfort and tenderness because of the engorgement is a major contributing component to the early cessation of breastfeeding. Alternative therapies like chilled cabbage leaves and other natural therapy can be encouraged to the mothers in low cost which can be used easily even at home without direction. All the studies was conducted on postnatal mothers including primi and multiparous in postnatal ward of maternity hospital. Objective: The objectives of the study were to evaluate the effectiveness of chilled cabbage leaves application for relief of breast engorgement among postnatal mothers. Method: A comprehensive systematic search of published literature and journal articles from PubMed, EBSCO to assess the effectiveness of cabbage leaf application on engorged breast among postnatal mothers that are focusing till 2017. Search strategy specific to each database was used. Result: During initial search 7899 titles were retrieved and after screening 8 articles were selected for full text screening. Finally 8 research articles were selected based on the inclusion criteria. Conclusion: The study was concluding that cabbage leaves fomentation is effective in the treatment of pain during breast engorgement.

Keywords: Chilled Cabbage Leaf application, breast engorgement, Pain and severity, Postnatal mothers

Introduction

Engorged breast develop in the mammary glands because of extension and pressure exerted by the synthesis and storage of breast milk. Engorgement usually develop when the breasts switch from colostrum to mature milk.

However, engorgement can also occur later if breastfeeding women miss several nursing and insufficient milk is expressed from the breasts. It can be developed by inadequate breastfeeding or blocked milk ducts. When engorged breasts may swell, throb, and cause pain. Volume of the breast milk is increase because of lymphatic and vascular congestion with interstitial edema during initial two weeks following the birth.

Numerous non-pharmacological therapy are there to reduce breast engorgement, utilization of cabbage is one of them. This is natural ways of reducing breast engorgement. It reduces maternal morbidity and help to enhance lactation. Based on the scientific evidences, application of cabbage is effective for relieving breast engorgement without side effects and use of cabbage leaves increase the breast feeding duration also. It is suggested the use of cabbage leaves for engorgement.

Cabbage contains sulphur which act as an anti irritant and antibiotic agent which in turn draws an extra flows of blood to the area. This dilates the capillaries and acts as a counter irritant, thus relieving the engorgement and inflammation and allowing milk to flow freely.

Aim

The aim of this review to evaluate the effect of cabbage leaf fomentation on breast engorgement.

Objective

To evaluate the effectiveness of chilled cabbage leaves application on pain and discomfort during breast engorgement.
engorgement among postnatal mothers.

Methodology

Search strategy methods-

An electronic search of articles published in various journals has been done. Search was restricted to only English language.

Types of intervention:

Cabbage leaf application, warm compression, chilled gel packs application, cold compression, hot water application.

Types of studies:

True experimental, Quasi experimental.

Type of participants

Postnatal mothers including Primiparous, Multiparity women.

Settings

Postnatal ward of maternity hospital

Outcomes:

This narrative review outcome shown that cabbage leaf application will be effective on breast engorgement

Result

The systematic search was conducted by framing the terms independently and in combination with all and synonyms, also according to the database. Likewise, a manual PubMed search was undertaken using the keywords and search synonyms from already found articles. An addition of 8 articles were found. Initial search retrieved 7899 articles over which 2582 articles were selected manually. 2375 articles were excluded as a result of duplications in two databases. Duplicates were removed and reviewed 207 articles for eligibility. 187 more studies were excluded because of inaccessibility of full text. Hence 8 articles were screened which includes quantitative study.

Discussion

According to Joy J, Kharde SN, 2016, it reveals that the mean pre test score (14.86) of postnatal mother is more than the mean post test score (1.33) and there was a significant difference between pre and post treatment scores (p<0.001) [1]

According to Tawheda Mohamed Khalefa E-ISaidy, Reda Mohamed-Nabil Aboushay, 2016, the study showed that there was a statistically significant difference between pre and post test score of pain and engorgement score for both groups (p<0.001) [2]

According to A-Reum Lim, Ji-Ah Song, Myung-Haeng Hur, et al, 2015, the study suggested that there are significant differences of breast hardness among three groups cabbage compression early breast care group showed significantly lower breast hardness compared with the early breast care and general nursing breast care [3]

According to Amanpreet Kaur, Nidhi Sagar, Mamta, Jasbir Kaur, et al, 2015, the finding of the study concluded that alternative cold and hot compresses had significant change in breast tenderness score had decrease of 5.73 to 1.00 in experimental group, where was cold cabbage leaves application had decrease of 6.30 to 2.70 in experimental group so the alternative hot and cold application are more effective [4]

According to Disha, Avinash Rana, Amarjeet Singh et al, 2015, the study reveals that The effectiveness of cabbage therapy was higher as a mean engorgement score after the application of chilled cabbage leaves was comparatively low that is 1.06±0.24 as compared to the hot compression that is 1.16±0.36. So the difference was not significant (p>0.05). This revealed that both interventions were equally effective. [5]

According to Mrs. Chaithanya Prashanth, 2014, finding showed that there is a significant difference in level of breast engorgement before and after the application of cabbage leaves (p<0.001). [6]

According to Kathryn L. Roberts, 2014, it reveals that significant reduction for the cabbage leaves (t=4.7; p=0.001) and for the gelpacks (t=5.6; p=0.001). The study reveals that significance was not found between post test mean score of cabbage leave and gelpacks (t=0.73; p=0.46). [7]

According to R. Nanthini, G. Bhuvaneshwari, 2013, the study suggested that out of 30 postnatal mothers have curable breast engorgement by giving both cabbage leaf application and hot water application. The overall t value was significant at the level of p<0.001.
This shows that there was significant improvement in both cold cabbage leaf application and hot water application.[8]

Ethical Consideration: This manuscript is ethically considered by the panel of Teerthanker Mahaveer College of Nursing, Teerthanker Mahaveer University after discussing with each and every point of this manuscript.

Summary of Findings

The available literature refines to get 8 quantitative. In this review 4 studies are showing that cabbage leaf is effective on breast engorgement among postnatal mothers and 2 studies shown that cabbage leaves and hot application having positive result on breast engorgement, but 1 study shown that hot application is more affective than the cabbage leaf and 1 study shown that alternative cold and hot compression is more effective as compare to cabbage leaves to reduce breast engorgement.

Future Significance

The study findings has focused new image on implication of the future. It has the suggestion in the regions of nursing administrations, nursing training, nursing organization and nursing research.

Many non pharmacological interventions are used to relieve breast engorgement. This therapy is one of them which help to improve lactation and reduce maternal morbidity.

Nursing students will be illuminated with satisfactory learning on evaluation of breast engorgement and non pharmacological strategy for relieving breast engorgement. Nursing students and public health nurses will be prepared in regard to cabbage leave application procedure on breast engorgement. The medical care taker should place emphasis on disseminating information related to evaluation of breast engorgement and their administration in the postnatal wards of the hospital. Nurses and midwives will be prepared with respect to different non-pharmacological techniques to relieve breast engorgement. This study will initiate the midwives to practice the cabbage leaves application to relieve breast engorgement by conducting in service education programme.

Application of cabbage helps to reduce swelling in moderate to severe engorgement and give the evidence for introducing the intervention in clinical practice. So such intervention is considered as a home remedy for women who is suffering from breast engorgement, as it can be applied without any complication.

Hence making awareness among the postnatal mothers is a way of promoting the utilization of such intervention in hospital and thereby it can reduce certain postnatal complication and improve the health of the mothers and baby.

Limitations

Computerized data bases were limited

Was limited to only in postnatal mothers.

Conclusion

There was a significant reduction in pain and severity of breast engorgement among postnatal mothers after application of chilled cabbage leaves. Thus it has proven to be an effective treatment for pain and severity of breast engorgement. Therefore, this intervention should be promoted as an institutional policy and implemented as a routine care for all postnatal mothers having breast engorgement for reducing pain and severity.

Source of Funding: Self

Conflict of Interest: Nil

References

2. Joy j, Kharde S N (2016). A study to evaluate the effectiveness of chilled cababbage leaves application for relief of breast engorgement in volunteered postnatal mothers who are admitted in maternity ward of selected hospital. Belagum: biomed Res.7(3);5655-5659.


Reliability Estimation and Pilot Testing of Diet Quality Assessment Tool for Indian Children

Ritushri Chamoli¹, Vandana¹, Monika Jain²

¹Research Scholar, ²Professor, Department of Food Science and Nutrition, Banasthali Vidyapith, Rajasthan, India

Abstract

Malnutrition in childhood is one of the reasons for the high child mortality rate which can be due to many reasons including inadequate intake of nutrients required for proper growth and poor diet quality. As no index for assessing diet quality of Indian children was found after reviewing of literature, the study aimed to standardize Diet Quality Assessment Tool for Indian children (DQAT). The study sample included 30 school going children selected randomly from school of Banasthali Vidyapith, Rajasthan. Dietary assessment was done by 24 hour recall method and reliability was evaluated using Crohnbach’s alpha, split half and test retest reliability. The intake of nutrients was in accordance with the recommended dietary allowances (RDA) except for energy and iron in both boys and girls. Reliability was 0.65, 0.85 and 0.59 by split half method, test retest and Crohnbach’s alpha method respectively suggesting low reliability, recommending the need for revision of DQAT items.

Keywords: reliability, diet quality, nutritional status, malnutrition, diet quality index, recommended dietary allowances.

Introduction

The school-age period is nutritionally important because it is the main time to build up body stores of nutrients in preparation for rapid growth during adolescence¹. Good nutrition is necessary to reduce illnesses and enhance cognitive development in school children; hence it is obligatory that these children meet their energy and nutrient requirements²,³. Diet with poor quality and less quantity is one of the reasons behind prevalence of malnutrition in children⁴. The challenge is no longer on consuming sufficient calories to avoid malnutrition, but how to eat adequately for optimal health and disease prevention. This transition has affected the significance of the diet quality concept.

It is believed globally that cardiovascular diseases and certain types of cancer can be prevented by diets that are often rich in fruit and vegetables⁵. Such diets have a positive impact in children on long-term health outcomes from cardiovascular diseases and asthma⁶. Since research has reported that the diet quality in children differs, methods of evaluating diet quality are necessary to monitor health status of children⁷.

Dietary surveys and diet quality indices are, therefore, essential components of nutritional assessment⁸. Dietary Quality Indices or Indicators (DQIs) are devised with an aim to assess the overall diet and help in deciding whether the individual is having healthy diet or not. DQIs are essential tools to assess the standard of the diet for specific populations not solely in terms of nutrient intake however conjointly in terms of food diversity and moderation. “The four ‘original’ diet quality scores are the Healthy Eating Index (HEI), the Diet Quality Index (DQI), the Healthy Diet Indicator (HDI) and the Mediterranean Diet Score (MDS) which have been referred to and validated most extensively⁹.” There is no such tool in India for assessing diet quality of Indian children. Hence, the present study was a pilot attempt.
to develop an index for assessing diet quality of Indian children which reflects the recommendations for Indian children according to national dietary guidelines\textsuperscript{10}.

**Materials and Method**

Study sample comprised of 30 school going children (n = 17 boys; n = 13 girls) who were randomly selected. All data collection was done in months of March and April 2016 only after seeking permission from the parents of the school going children and the concerned school authority.

**Development of the Diet Quality Assessment Tool (DQAT) for Indian children**

Diet quality of 7 to 9 years of age was assessed using HEI\textsuperscript{11}, EKINDEX\textsuperscript{12}, DQI\textsuperscript{13}, MDS\textsuperscript{14} and a self-developed tool. After assessment, all the subjects were classified in the unhealthy category. Not finding any of the tool of diet quality correlating well with nutritional status of children, an effort was made to develop a tool according to dietary guidelines for Indian children.

The index was developed using nineteen components that reflect the dietary guidelines\textsuperscript{10} for Indians. The components included cereals, pulses, meat products, milk and milk products, green leafy vegetables, fruits, sugar, roots and tubers, other vegetables, overall variety, empty calorie foods, frequency of breakfast consumption, frequency of consumption of meal given in lunch box, number of meals in a day, frequency of consumption of least favorite food, consumption of meal from any other place except home during the previous two days, dietary behaviour regarding consumption of advertised foods, consumption of homemade foods, sodium and total energy from fats.

Subjects whose dietary intake was in compliance with the dietary recommendations for Indian children\textsuperscript{10} aged 7-9 years of age were awarded maximum points, while those whose diet was not in compliance were awarded minimum points. The Indian DQAT scoring system focused not only on frequency of consumption of different food groups but also on moderation in intake of foods and nutrients shown to be associated with increased risk of some chronic diseases and dietary behaviour regarding food consumption of school age children. Overall DQAT score was ranging from 0-80.

**Data collection**

To ascertain the dietary quality and dietary quantity of the subjects, Dietary Quality Index for Indian children and 24 hour dietary recall methods were used. The present study was designed according to the guidelines for ethical consideration in human studies as suggested by ICMR\textsuperscript{15} (2017), on the basis of revised Helsinki Declaration (2013). All reasonable steps were taken to maintain subjects confidentiality.

For the 24-hour dietary recalls the investigator collected information on food/beverages consumed in the previous 24 hours, including type, amount, brand name, food preparation method and any additions (e.g. sugar in coffee, ghee to chapatis etc)\textsuperscript{16}. Amount of food consumed by the subjects was converted into nutrients using Indian Nutrition Software – “DietCal – A Tool for Dietary Assessment and Planning” (software version-3.0).

**Reliability and statistical analysis of the DQAT**

Reliability was assessed through test retest reliability, split half method and Cronbach’s alpha. A scale is defined as having good internal consistency if Cronbach’s alpha is 0.5 or greater\textsuperscript{17}. Test retest reliability was conducted at one month interval and correlation coefficient was used for determining it. The data was analyzed by suitable statistical methods using IBM SPSS Statistics - 20.0 and M.S. Excel software. A p<0.05 was considered statistically significant. Reliability and validity statistics was used for DQAT standardization. Range for unhealthy, moderately healthy and healthy was decided with the help of statistically calculated tertiles.

**Results**

The mean age of the study group was 8.07 ± 0.88 years. Mean ages of boys and girls were 8.07 ± 0.88 and 8.13 ± 0.89 years respectively. The DQAT comprises of 19 items divided into three different parts: food intake, dietary behavior and moderation. As DQAT had items related to nutrient intake as well, the food and nutrient intake of subjects was assessed using 24 hour recall.

As assessed by the food behavior part of DQAT, there were 50% school children who were having empty calorie foods 5-10 times per week and 10% were having empty calorie foods more than 10 times per week. Majority of the subjects (86.7%) in the present study
were having breakfast daily. It has been reported in the past that the prevalence of skipping breakfast was 23.5% in children in some areas of Udupi district, India\textsuperscript{18} which is higher than the observation of present study. There were 20% breakfast skippers in another study done on children\textsuperscript{19}. One third subjects were having more than 3 meals per day. Most of the parents (80%) reported that their child finished tiffin daily. Less than half of the subjects reported that they were having their least favorite but healthy food daily. Majority of the subjects reported that they are not attracted to commercially packaged foods by advertisements. One fifth subjects reported that they do not eat everything prepared at home. None of the subjects were consuming all the food groups daily.

In case of food intake, there were only 23% subjects who were consuming pulses as per the requirement (≥2 serving/day). Milk was consumed regularly by more than half of the study group (57%) as per the recommendations (≥5 servings per day) and fruits were also consumed by majority of the subjects (87%) as per the recommendations, i.e., ≥1 serving/day. The percentage of children consuming sugar more than RDI was 75%. There were 23% subjects who were consuming green leafy vegetables as per the recommendations (≥1 serving/day) and cereals were consumed by only half of the sample as per the recommendations (≥6 serving/day). Most of the subjects (67%) were having ≥1 servings of roots and tubers daily which is a recommended intake for Indian children. Only 23% subjects were having other vegetables in their diet as per the RDI. Regarding moderation, there were 17% subjects whose sodium intake was as per the RDA (≤ 2 grams per day) and majority (60%) of the subjects diet were having more energy from fat in their diet than the recommended, i.e., >25% of total energy. It was reported in a study that salt intake in India is high and the mean population intake is also higher than the amount recommended by World Health Organization, i.e., 5 g/day\textsuperscript{20}. Daily mean intake of food groups and nutrients are depicted in table 1 and table 2.

Total scores were calculated for each of the subjects and the mean score obtained for the subjects using DQAT was 62.38 ± 7.45 (median = 63). The scores of school children ranged from 45 to 74. There was no significant difference observed in scores obtained between boys and girls (p = 0.76). The mean scores obtained by boys were 62.8 and girls was 61.9. As it is evident in table 3, one third of the subjects were having healthy diet on the basis of statistically calculated tertiles as these subjects were having lesser empty calorie foods and more fruits and vegetables. Two third of the subjects were having unhealthy and moderately healthy diet respectively because these were the subjects who were consuming more empty calorie foods and lesser fruits, vegetables and milk than the recommended amounts as per the national dietary guidelines.

Reliability of this tool by split half method and test retest reliability was 0.65 and 0.85 respectively as is shown in table 4. Generally value of 0.60, 0.70 and 0.80 are considered acceptable, adequate and good\textsuperscript{21,22}. Cronbach’s alpha for this tool was 0.59. However Cronbach’s alpha after deleting one item of this tool ranged from 0.51 to 0.68. It was suggested by Tuckman that a Cronbach’s alpha of 0.50 or greater can be accepted for attitude assessments\textsuperscript{17}. Reliability of this tool by split half method is less acceptable. But test retest method correlation coefficient is good as is shown in table 3. Correlation coefficient for different items of this tool ranged from 0.50 to 0.91. There are different reports about the acceptable values of alpha, ranging from 0.70 to 0.95\textsuperscript{23,24,25}. A low value of alpha could be due to a lesser number of questions, poor relation between items or heterogeneous constructs. Since the reliability of this tool was not so good it is clear that this index needs to be reviewed before implementation.

### Table 1: Daily food intake by the subjects

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Group</th>
<th>RDA</th>
<th>Daily intake (Mean ±SD)</th>
<th>t test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereal (g/d)</td>
<td>M</td>
<td>180</td>
<td>159.67 ± 53.35</td>
<td>-0.540\textsuperscript{28}</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>172.02 ± 69.37</td>
<td></td>
</tr>
</tbody>
</table>
**Table 1: Daily food intake by the subjects**

| Pulses (g/d) | M   | 60  | 28.71 ± 15.09 | 41.46 ± 24.27 | -1.63\(^{NS}\) |
| Fat (g/d)    | M   | 30  | 38.20 ± 16.45 | 31.29 ± 11.14 | 1.32\(^{NS}\) |
| Milk (g/d)   | M   | 500 | 362.86 ± 202.69 | 425.00 ± 163.57 | -0.89\(^{NS}\) |
| Fruits (g/d) | M   | 100 | 138.85 ± 101.06 | 187.23 ± 88.14 | -1.30\(^{NS}\) |
| Leafy vegetables (g/d) | M | 100 | 73.00 ± 31.56 | 72.73 ± 36.90 | 0.02\(^{NS}\) |
| Other vegetables (g/d) | M | 100 | 62.25 ± 37.15 | 74.00 ± 43.19 | -0.69\(^{NS}\) |
| Roots and tubers (g/d) | M | 100 | 114.53 ± 49.41 | 112.69 ± 37.37 | -0.07\(^{NS}\) |
| Sugar (g/d)  | M   | 20  | 20.31 ± 16.72 | 29.42 ± 17.41 | -1.33\(^{NS}\) |

**Table 2: Daily energy and nutrients intake by the subjects**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Group</th>
<th>RDA</th>
<th>Daily intake (Mean ±SD)</th>
<th>t test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal/d)</td>
<td>M</td>
<td>1690</td>
<td>1355.9 ± 227.1</td>
<td>0.226(^{NS})</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>1363.0 ± 237.1</td>
<td></td>
</tr>
<tr>
<td>Protein (g/d)</td>
<td>M</td>
<td>29.5</td>
<td>33.3 ± 7.3</td>
<td>0.588(^{NS})</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>34.8 ± 5.0</td>
<td></td>
</tr>
<tr>
<td>Fat (g/d)</td>
<td>M</td>
<td>30</td>
<td>53.2 ± 14.4</td>
<td>0.739(^{NS})</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>52.2 ± 14.3</td>
<td></td>
</tr>
<tr>
<td>Vitamin C (mg/d)</td>
<td>M</td>
<td>40</td>
<td>82.6 ± 64.4</td>
<td>0.522(^{NS})</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>82.7 ± 48.2</td>
<td></td>
</tr>
<tr>
<td>Calcium (mg/d)</td>
<td>M</td>
<td>600</td>
<td>654.4 ± 204.3</td>
<td>-2.544*</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>709.1 ± 154.4</td>
<td></td>
</tr>
<tr>
<td>Iron (mg/d)</td>
<td>M</td>
<td>16</td>
<td>10.7 ± 2.4</td>
<td>0.234(^{NS})</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td></td>
<td>11.0 ± 2.9</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3: Gender wise distribution of subjects on the basis of statistically calculated tertiles**

<table>
<thead>
<tr>
<th>Diet quality (score)</th>
<th>All subjects</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 30</td>
<td>%</td>
<td>n = 17</td>
</tr>
<tr>
<td>Unhealthy (&lt;58)</td>
<td>9</td>
<td>30.0</td>
<td>7</td>
</tr>
<tr>
<td>Moderately healthy (58-67)</td>
<td>11</td>
<td>36.7</td>
<td>5</td>
</tr>
<tr>
<td>Healthy (&gt;67)</td>
<td>10</td>
<td>33.3</td>
<td>5</td>
</tr>
</tbody>
</table>
Table 4: Reliability statistics of Indian DQAT

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type of test</th>
<th>Acceptable cut off marker</th>
<th>Value obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Split- half method</td>
<td>-1 to +1 (Perfect negative to perfect positive relationship)</td>
<td>0.65</td>
</tr>
<tr>
<td></td>
<td>Test- retest method</td>
<td>0.9 or greater (Excellent reliability)</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Cronbach’s alpha method</td>
<td>&gt;0.7 (Acceptable)</td>
<td>0.59</td>
</tr>
</tbody>
</table>

Conclusion

To our knowledge this is the first study to develop diet quality index for Indian children. This index has been developed to evaluate the adherence of diets of Indian children to recommended dietary guidelines for Indian children. Crohnbach’s alpha was not consistent with standard value. This could be due to the longevity of the tool. It needs to be modified in order to improve its reliability for future use. Further research needs to be done for making it more reliable and for standardization of new improved tool by addition or deletion of certain components.

Consent forms were signed by parents of the subjects.

References


Effect of Task Related Exercise on Arm and Hand Function among Patients with Stroke

Deepthi John¹, Kanmani J²

¹M.Sc. Nursing Student, Amrita College of Nursing, Amrita Vishwa Vidyapeetham, Health Sciences Campus, AIMS- Ponekkara P.O, Kochi. ²Professor, Department of Medical Surgical Nursing, Amrita College of Nursing, Amrita Vishwa Vidyapeetham, Health Sciences Campus, AIMS- Ponekkara P.O, Kochi

Abstract

Background: Stroke is a chronic neurologic disorder that often results in severe functional impairments. The functional capacity of the upper extremity is largely affected causing residual impairments in the post stroke patients. Task specific training improves functional outcomes after stroke.

Purpose: The main purpose of the study to compare the arm and hand function before and after task related exercises among experimental and control group of patients with stroke.

Method: A quasi experimental study was conducted on the effect of task related exercises on arm and hand function among patients with stroke in selected wards, AIMS hospital, Kochi. The study was done on 60 subjects, 30 each to experimental and control group scheduling task related exercise for a 2 weeks period for 20 minutes two times a day. Purposive sampling was done and matching of the two groups was done based on pretest scores. A standardized Chedoke Arm and Hand Activity Inventory (CAHAI-7) tool was used for the assessment.

Results: The study results showed that the mean pretest score of arm and hand function in both experimental and control group was 24.07, while mean post test score of control group was 26.33 and of experimental group was 30.93. A significant improvement in the post test scores after providing task related exercises was noted (t=8.34,p=<0.001) A significant association between time of arrival of hospital after the onset of symptoms and arm and hand function was noted (F =8.68,p<0.05).

Conclusion: The study concluded that the task related exercises are effective in improving arm and hand function in post stroke patients.

Keywords: Task related exercise; arm and hand function; post stroke patients.

Introduction

Stroke is defined as an acute onset of neurological dysfunction due to abnormality in cerebral circulation which results in signs and symptoms that correspond to involvement of focal areas of brain. The WHO defined it as a clinical syndrome identified by rapidly developing signs of focal or global disturbance of cerebral functions lasting more than 24 hours or leading to death, with no apparent cause other than the vascular origin.¹

The heterogeneous consequences of stroke cause residual impairment in a number of functions fundamental for everyday activities. Aside from loss of gross motor function, fine motor skills of the stroke victims may be affected after a stroke ².
According to the World Health Organization, 15 million people suffer stroke worldwide each year. Of these, 5 million die and another 5 million are permanently disabled. In India, the prevalence of stroke was estimated as, 18,012,222 and the population estimated used was 1,065,070,607. In Kerala the annual incidence rate of stroke was 180/100,000 population. According to Trivandrum Stroke Registry, the incidence of stroke was 180/100,000 population.4

The global campaign to fight stroke continues to gain attention from stroke communities around the world. World Stroke Day has been observed on October 2009. The overarching “1 in 6” theme of the campaign continued in 2012/2013.6

Galea MP, Rushey K, Gainu JK in a true experimental study in 2001 studied effect of Early Task-Related Training for Upper Limb Function Following Stroke in 60 stroke patients in Spain who underwent a 3-week long program that consisted of 45-minute task-specific, upper limb training showed improvements in measures of motor function, dexterity, and increased use of the more affected upper limbs (p=0.05).7

A true experimental study was conducted by Boyd LA, at Canada over 18 subjects with chronic stroke with task-specific exercise showed significant improvement (SD 5.67, CI: 95%) in hand function at 0.05 significance level.

A randomized control trial was conducted by Blennerhasse J & Dite in Australia over 30 stroke patients to assess the effect of additional task related practice on mobility and upper limb function. The Mobility Group had better loco motor ability than the Upper Limb Group (between-group differences of 116.4 m, 95% CI 31.4 to 201.3 m, Step Test 2.6 repetitions, 95% CI -1.0 to 6.2 repetitions).

Task specific training improves functional outcomes after stroke.10 Studies of task related training showed benefits for functional outcome compared with traditional therapies. The routine traditional exercises alone are not enough in the management of stroke survivors. Nurses are hence exploring means to improve the client functional capacity through the alternatives like task related strengthening exercises.

Method

Research design

A quantitative approach with quasi experimental, pre-test post-test control group design was adopted for the study.

Hypothesis:

H1: There is significant difference in mean scores of the arm and hand function before and after administration of task related exercises.

H2: There is significance difference in the post test arm and hand function scores of the experimental and control group.

H3: There is significant association between arm and hand function and selected demographic variables.

Sample and sample size: All the clients with stroke having arm and hand dysfunction, getting admitted to AIMS, Kochi was considered as the target population. Total of 60 subjects were chosen for the study 30 each to experimental and control group.

Sampling technique: A non probability purposive sampling.

Inclusion criteria

• Age: 30-70 years.

Patients having Chedoke Arm and Hand Activity Inventory score > than 20

Patients with a history of first stroke.

Exclusion criteria:

• Subjects who have impaired cognitive status, psychiatric or perceptual disorders.

Hemodynamically unstable subjects.

Patients with any musculo skeletal disorders of upper limb, any vestibular dysfunction, hearing and visual impairment.

Study variable:

Independent Variable The independent variable is the task related exercises.

Dependent Variable: The dependent variable is arm and hand function among stroke patients.
Data collection instruments:

**Tool I** – It is a semi-Structured questionnaire with two sections. Section A: Socio Demographic data and Section B: Clinical Data that consists of total of 12 test items.

**Tool II** - Chedoke Arm and Hand Activity Inventory (CAHAI-7). It is a standardized performance tool with 7 tests items which are performance based tasks. The activity scale gives scoring from 1 to 7, thus total score of 49, of which total score 1-19 has severe dysfunction, 20 – 39 has moderate and above 39 has mild dysfunction. Tool reliability was assessed using test retest method (0.96) and content validity was 0.86.

Data collection

After taking informed consent a pre test was conducted using CAHAI- 7 tool. 60 Clients with CAHAI-7 score greater than 20 were selected as subjects and 30 each were allocated to experimental and control group. Homogeneity of the two groups was done using their pre test scores. The experimental group was provided task related exercises for 2 weeks and on the 14th day post test was done for the two groups.

Results

Section A: Clinical variables of the subjects

**Table 1:** Distribution of samples based on clinical variables n=30+30

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td><strong>Present GCS score</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>12</td>
<td>22</td>
<td>73.3</td>
</tr>
<tr>
<td>13</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td><strong>Daily use of medications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>33.3</td>
</tr>
<tr>
<td>No</td>
<td>20</td>
<td>66.7</td>
</tr>
<tr>
<td><strong>Type of stroke</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ischemic stroke</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td><strong>Time of hospitalization after onset of symptoms</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-60 minutes</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td>1-3 hours</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>&gt;3 hours</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td><strong>Co-morbidities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Diabetes</td>
<td>13</td>
<td>43.3</td>
</tr>
<tr>
<td>Hypertension</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td>Diabetes and hypertension</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td><strong>Affected upper limb.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right arm</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Left arm</td>
<td>12</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 1 shows that, 22(73.3 %) in experimental group and 19(19%) in control group had Glasgow Coma Scale (GCS) score of 12. Daily use of medication was reported in 10(33.3%) of experimental and 16(53.3%) of control group. All the 60 samples had ischemic stroke maintaining homogeneity. 15(50.0%) in experimental group and 16(53.3%) in the control group had time of hospitalization within 1-3 hours of symptom onset. Among the subjects 18(60%) of the experimental group and 17 (56.7%) of the control group has right arm affected with stroke thus maintaining homogeneity of the groups.
Section B: Comparison of the mean pre test and post test score of arm and hand function of the experimental and control group.

\[ n=30+30 \]

Fig 1. The mean pre test and post test score of arm and hand function of the experimental and Control group.

Figure 1 shows the mean pre test score of arm and hand function of both experimental and control group was 24.06, while mean post test score of control group was 26.33 and of experimental group was 30.93.

Section C: Comparison of pre test and post test scores of arm and hand function of the experimental group.

Table 2: The pre test and post test scores of arm and hand function of the experimental group. \[ n = 30 \]

<table>
<thead>
<tr>
<th>Arm and hand function score</th>
<th>Pre test</th>
<th>Post test</th>
<th>Mean difference</th>
<th>t value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>24.06</td>
<td>1.76</td>
<td>30.93</td>
<td>2.49</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\( t=3.66, \ p < 0.001, \ df - 58 \) *** Significant

Table 2 presents the mean, standard deviation, mean difference and paired t test value of arm and hand function before and after providing task related exercises. Since the table value (3.66) was less than calculated t value (35.011), there was significant improvement in the post test scores at 0.001 level of significance.

Section D: Comparison of the post test scores of arm and hand function of the experimental and control group.
Table 3: The post test scores of arm and hand function of the experimental and control group. n= 60

<table>
<thead>
<tr>
<th>Arm and hand function score</th>
<th>Pre test</th>
<th>Post test</th>
<th>Mean difference</th>
<th>t value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td>26.33</td>
<td>1.70</td>
<td>30.93</td>
<td>2.49</td>
</tr>
</tbody>
</table>

(t = 3.46, p< 0.001, df-58) ***significant

Table 3 presents the mean, standard deviation, mean difference and independent t test value of arm and hand function after providing task related exercises in the experimental and control group. Since the table value (3.46) was less than calculated t value (8.342), there was significant improvement in the post test scores of arm and hand function of the experimental group at 0.001 level of significance.

Table 4. Comparison of arm and hand function and of various time of hospitalization after symptom onset by using one way ANOVA. n = 60

<table>
<thead>
<tr>
<th>Arm and hand function score</th>
<th>Time</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Mean</th>
<th>SD</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15-60 minutes</td>
<td>24</td>
<td>40</td>
<td>24.91</td>
<td>1.38</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-3 hours</td>
<td>31</td>
<td>51.6</td>
<td>23.74</td>
<td>1.71</td>
<td>8.68*</td>
</tr>
<tr>
<td></td>
<td>&gt;3 hours</td>
<td>5</td>
<td>8.3</td>
<td>22</td>
<td>1.22</td>
<td></td>
</tr>
</tbody>
</table>

(F = 3.15, df – (2, 57), p < 0.05) * Significant

Table 4 presents the frequency, mean, standard deviation and F value of comparison of arm and hand function score and time of hospitalization after the onset of symptoms. Since the table value (3.15) was less than calculated F value (8.68), there was significant association between arm and hand function and time of hospitalization after onset of symptoms at 0.05 level of significance.

Discussion

The first objective of the study was to assess the arm and hand function of patients with stroke before and after providing task related exercises. The study results showed that the mean pre test score of both experimental and control group as 24.06, while mean post test score of control group is 26.33 and of experimental group is 30.93. There is an increase in the post test arm and hand function mean scores after administration of task related exercises. Thus the first hypothesis there is significant difference in mean scores of the arm and hand function before and after administration of task related exercises was accepted. Mohammed A K etal, in 2010 at New Delhi studied the effects of Task Related Training and Hand Dominance on Upper Limb Motor Function in 32 subjects with Stroke, divided into 4 groups with 8 subjects each took part in the study with a true experimental design. The study results showed that mean pre test scores of group 1 was 21.40 and post test scores was 26.34.Thus the study findings supports the first objective that there exist a change in arm and hand function scores after administration of task related training.

The second objective of the study was to compare the arm and hand function before and after the intervention. The test results showed that the calculated t value was 35.01 which were higher than the table t value 3.46. Hence, the null hypothesis was rejected stating that there is significant change in the post test scores of arm and function of the experimental group. Blennerhasset & Dite *(2004) conducted a randomized trial on effect of additional task related practice on mobility and upper limb function in Australia over 30 stroke patients. The Mobility Group had better loco motor ability than the Upper Limb Group (between-group differences of 116.4
m, 95% CI 31.4 to 201.3 m, Step Test 2.6 repetitions, 95% CI -1.0 to 6.2 repetitions).

Third objective was to compare the arm and hand function in the experimental and control group after the intervention. In the present study found that the task related exercise was effective on the 14th day of intervention with p significant at 0.001 level of significance. Thus the null hypothesis was rejected. The post test Chedoke Arm and Hand function Inventory score of the experimental group was greater than the control group. Hence, it was concluded that the task related exercises prove significant effect on the arm and hand function of patients with stroke. Harris JE, Eng JJ, Miller WC, Dawson in 2009 conducted a study on, a self-administered Graded Repetitive Arm Supplementary Program (GRASP) to improve arm function during inpatient stroke rehabilitation in Canada. 103 in patients with stroke were randomized to the experimental group (GRASP group, n=53) and in the control group (education protocol, n=50). GRASP was a combination of task related exercises. At the end of the 4-week intervention (approximately 7 weeks post stroke), the GRASP group showed greater improvement in upper limb function Chedoke Arm and Hand Activity Inventory (CAHAI) compared to the control group (mean difference 6.2; 95% CI: 3.4 to 9.0; P<0.001).

The fourth objective for the study was to find the association between arm and hand function and selected demographic variables. There was an association found between arm and hand function and time of hospitalization after symptom onset. The results showed that greater arm and hand function score was noted on early hospitalization after the symptom onset. Giuseppe A et al in 1997 studied Effect of Delay on the Clinical Efficiency of Early Treatment in 189 patients (84 men, 105 women; mean age, 76.5 years) prospectively collected in the Community Teaching Hospital in Bologna, Italy. The mean interval between onset of symptoms and hospital arrival was 680 minutes; 59 patients (31%) arrived within 2 hours and 100 (53%) within 5 hours. The effectiveness of 17%, extrapolated with the aid of the odds ratio of 1.6 of having a favorable outcome (Barthel Index ≥95 at 3 months) in treated versus patients with delayed treatment group.

Limitations

The subjects included in the study were only from the group of moderate arm and hand dysfunction with CAHAI score between 20-39. None of the subjects with hemorrhagic stroke were available during the time of data collection.

Conclusion

The investigators conclude the effectiveness of task related exercise in acute phase of stroke. It was also an indicator towards the concept of early rehabilitation to prevent or minimize complications. The study depicted the need and importance of implementing task related exercise to improve the arm and hand function in patients with stroke.

Conflict of Interest : Nil

Source of Funding : Self

Ethical Consideration

Permission had been taken from the research committee of Amrita College of Nursing and Thesis Review Committee of AIMS, Kochi. Consent was obtained from the subjects.

Reference

7. Galea MP, Rushey K, Gainu JK. Early Task- Related Training Enhances Upper Limb Function Following Stroke. Poster presented at the annual meeting of the
Society for Neural Control of Movement, Sevilla, Spain, 2001
Self-disclosure and Quality of Relationship amongst Spouses of Combatants at a Forward Fighter Airbase

MPS Marwaha1, M V Singh2, Rajesh Vaidya3, Bhupinder Kaur Anand4, Alok Kumar Chowdhury5, Rajat Kumar Garg6

1Classified Specialist Aviation Medicine, Air Force Centre Medical Establishment, New Delhi, 2 Commandant AMC Centre and College, Lucknow, 3HOD & Professor Department of Community Medicine, Army Medical College, Delhi, 4Professor, Department of Community Medicine, SGT Medical College, Gurugram, 5Associate Professor, Department of Psychology, ADAMAS University, Kolkata, 6Graded Specialist Psychiatry, Air Force Centre Medical Establishment, New Delhi

Abstract

Objective: The aim of the study was to gain knowledge of the quality of relationship and self-disclosure amongst spouses of combatants at a forward airbase.

Method: 30 wives of Serving personnel of a forward base were voluntarily administered quality of relationship scale along with self-disclosure scales. It was done during health camp and meetings organized by the Station Health Authorities. Data were tabulated and analyzed through SPSS-ver.11 for descriptive and correlations purposes.

Results: The mean age of marriage was 22.4 years and 25.9 years for wives and (husbands) respectively. The study sample has 10.4 years of marital life experiences. Wives reported their quality of relationship with their husbands in terms of depth, affection, support and physical intimacy, while they mostly do self and family related disclosures with their husbands.

Conclusion: Conflict coping strategies are tri-pronged namely active, emotional & avoidance. Emotional coping is a major cause of stress overloading in a relationship. In the present study, Conflict avoidance in quality of relationship is positively correlated with Self (p<.01) and Family (p<.05) related disclosures in all issues amongst the couples residing at the fighter base. Conflict avoidance is helpful in alleviating stress overloading, among couples. These results can be useful in dealing in other relationships also.

Keywords- Self-disclosure, quality of relationship, wives

Introduction

Close personal relationships are the very essence of human existence; nearly as fundamental to survival as air and water are the links between people: mother & son, lover & lover, wife and husband1. Relationships are characterized by at least one of the three factors: emotional attachment, need fulfillment, and interdependence2. At the behavioral level, a relationship implies first a series of interaction between two people, involving interchanges over an extended period of time3.

Relationships among spouses are most important aspect of marital life. The present day scenario depicts the quality of relationships as getting worse day-by-day. According to Indian National Crime Records Bureau’s 2009 reports, suicidal attempts of Indian housewives, dowry deaths, domestic violence etc. all are depicting the tale of worsening relationships. Moreover, this strain in relationship escalates stress in normal life.

What are the reasons behind the deteriorating quality of relationship? There are several processes such as emotion, attachment, intimacy, social support, conflict...
and communication that are conducive to development, maintenance, renewing, disruption, and even termination of relationships, if they are not taken care of.

Communication plays a major role in determining the quality of family life. A crucial modality of communication is self-disclosure. It is hard to imagine how a relationship might get started without such self-disclosure. Self-disclosure loosely defined as what individuals verbally reveal about themselves to others (including thoughts, feelings and experiences) that plays a major role in close relationships. Kamarovshy found that self-disclosure seemed to be positively related to marital satisfaction in couples. In a close relationship, conversation is both indexical, as we are more likely to like and disclose to those who disclose to us, in that it conveys the emotional status of the interaction. In short, communication in relationship creates and maintains a relational culture.

In the light of above the researchers had these objectives:

1. To study the quality of relationship of wives with their husbands serving in a forward/ peripheral air base.
2. To study the self-disclosure of wives with their husbands.
3. To study the relationship between quality of relationship and self-disclosure.

Material and Method

Study Population:- Study group constituted 30 wives of Serving residing at a forward Airbase. Their husbands were working at the same base.

Data collection:- Their mean age is 32.8±5.3 years. The mean age of marriage was 22.4 years and 25.9 years respectively for wives and husbands. The study sample has 10.4 years of marital life experiences. Quality of relationship inventory; an abridged version by Alok & Misra was administered to measure the quality of relationship of respondents with their husbands. The inventory has 26 items pertaining to ten dimensions i.e. conflict avoidance, physical intimacy, possessiveness and dominance by CIFA of Werner & Green, 2000; depth, conflict and support by QRI of Pierce, 1994 affection, mutuality and interaction. Obtained reliability was 0.72. Self-disclosure scale by Alok & Misra was used to measure the level of self-disclosure of respondents for different areas of their life. Self-disclosure scale contained 23 items. Obtained reliability of this scale was 0.63.

Data analysis:- Data were tabulated and entered into Excel software package. The entered data was analyzed through the Statistical Package for Social Science (SPSS-ver.11). Descriptive statistics and correlation were done.

Findings

Means for quality of relationships are as follows:

Table 1: Correlation (r) between various dimensions of Quality of Relationship and various components of Self-disclosure

<table>
<thead>
<tr>
<th>n=30</th>
<th>Self-disclosure related to…</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Family</td>
</tr>
<tr>
<td>Self</td>
<td>Depth</td>
</tr>
<tr>
<td></td>
<td>Affection</td>
</tr>
<tr>
<td></td>
<td>Support</td>
</tr>
<tr>
<td></td>
<td>Physical Intimacy</td>
</tr>
<tr>
<td></td>
<td>Conflict Avoidance</td>
</tr>
<tr>
<td></td>
<td>Maturity</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
</tr>
<tr>
<td></td>
<td>Dominance</td>
</tr>
<tr>
<td></td>
<td>Possessive</td>
</tr>
<tr>
<td></td>
<td>Lack of Conflict</td>
</tr>
</tbody>
</table>

**p<.01, *p<.05
The above table (table #1) shows that Conflict Avoidance (CA) of Quality of Relationship is positively correlated (p<0.01) with ‘Self’ related disclosures. It is also positively correlated (p<0.05) with ‘Family’ and ‘stress due to self & family’ related disclosure.

**Discussion**

It is established from the present study that relationship amongst the subject group of couples is ‘in-depth’(3.83±0.27), ‘affectionate’(3.80±0.36) and ‘supportive’(3.73±0.40). Couples have good physical intimacies(3.20±0.57) amongst them. Conflict avoidance(2.95±0.44), maturity(2.90±0.68), interactions(2.85±0.59) were moderately reported and as well as significant dominance(2.87±0.64) was also shown in the study. Study revealed a low value of possessiveness(2.45±0.64) and lack of conflicts(2.00±0.67) were amongst the couples. Suggestive study is of the fact that conflicts are present in the relationships.

Wives have reported that they disclose to their husbands almost every matter related to self(2.86±0.65), family (2.55±1.05) and friends (2.40±1.07) regularly, but sexual matters (2.10±1.67), neighbors (2.10±1.06) and stress due to self & family related (1.91±1.36) disclosures were the least disclosed factors. Higher levels of disclosure intimacy occurred in the high intimacy condition than in the low intimacy condition.

The study also established the fact that conflict avoidance was positively correlated with self and family related disclosures among the couples. These data is giving an inclination for inculcating the habit of self and family related issues among them to avoid conflicts amongst themselves. Self-disclosure of emotions is also a more important predictor of intimacy than self-disclosure of facts and information.

The above results are based on young couples having an average of ten years of marital life experiences. However, research work by Dindia et al is suggestive of the fact that women discloses greater to female and same sex partners than to opposite-sex or male partners.

The present study results may be compared with aged and old couples to get the broader representation of self-disclosure and quality of relationship because, disclosure levels decreases with time-related factors such as age, length of marriage and in particular, the number of children. So these results can be useful in dealing with other relationships also.

**Conclusion**

It is evident from the present study that, Conflict avoidance in quality of relationship is positively correlated with Self (p<.01) and Family (p<.05) related disclosures amongst couples of combatants. It is pertinent to bring out the fact that conflict avoidance is immense to the nature of issues. These results can be extrapolated in dealing with other relationships also. In future these findings need to be validated with the larger sample size.

**Conflict of Interest:** No Conflicts Of Interest.

**Source of Funding:**

**Ethical Clearance:**

Certificate from Head of the Institution where study has been carried out

Certified that I have no objection to the publication of the article titled “Self-disclosure and Quality of Relationship amongst spouses of combatants at a forward fighter airbase of IAF” in Medical Journal written by “MPS Marwaha, MV Singh, Rajesh Vaidya, Alok Kumar Chowdhury, Bhupinder Anand, Rajat garg” for which study has been carried out in this institution / at Air Force Station.

**References**


Experience of Prioritizing in Nursing Care in India: A Qualitative Study

Lata Mandal¹, A Seethalakshmi²

¹Research Scholar; ²Reader & Head of Department, Department of Nursing Foundation, Faculty of Nursing, Sri Ramachandra, Institute of Higher Education and Research, Chennai, India

Abstract

Background: Prioritizing in nursing care is also known as rationing of care or missed care. It implies any aspect of required patient care that is significantly delayed or omitted. The phenomenon is closely related to patient safety and quality of nursing care. This Qualitative study was undertaken with the aim of acquiring a comprehensive understanding of nurses’ experience of Prioritization in nursing care.

Material & Method: Six focus group interviews were conducted among 38 purposively chosen nurses involved in direct patient care in three tertiary care hospitals of East and South India. Data was analysed through thematic content analysis.

Results: Three major themes emerged from the data: (a) Priority of Curative over Carative activities (b) Organizational factors effecting Prioritization (d) Perceived outcomes of Prioritization.

Conclusion: Prioritizing in nursing care follows the curative doctrine of health care by giving importance to the activities related to the patients’ medical needs. Organizational factors like human resource inadequacy and conflict over role responsibilities of nurses were the perceived reasons influencing prioritizing. The findings suggested that the phenomenon is detrimental for the quality of nursing care and patient related outcomes. Further research is recommended to capture the full spectrum of the phenomenon. Nursing leadership needs to acknowledge and create scope for explicit discussion of the issue among nurses and other health care members.

Keywords: Prioritization of care, Rationing of Care, Patient safety, Quality of Nursing Care

Introduction

Prioritized care is known by different names like Missed care and Rationed care.¹ The concept implies “any aspect of required patient care that is omitted or significantly delayed”.² Literature suggests that nurses commonly gave more priority to bio medical aspects of care like administration of medicines and assistance in diagnostic procedures and delay or completely miss individual and interpersonal aspects of care like teaching or personal hygiene.³ Studies done all over the world demonstrated that prioritization of nursing care significantly influenced negative patient outcomes ⁴⁻⁶ and jeopardized the overall quality of nursing care.⁵ Qualitative studies exploring nurses’ experience of rationing patient care have consistently described nurses feeling guilt and ethical dilemma.⁹,¹⁰ The conceptual Model of Missed nursing care attributed organizational characteristics like adequacy of human and material resources, nursing work environment along with nurses’ individual level factors like values, attitude and role responsibilities to influence nurses’ decision of prioritizing certain tasks over others. ²

In India, there is a total lack of literature on Prioritization of nursing care and the concept remains
more or less unacknowledged and sensitive in the health care settings. Therefore, an attempt to quantitatively measure the phenomena without an in depth understanding of the Indian scenario would be unrealistic and insensitive. This Qualitative research was taken up as an initial field study before conceptualising a project on rationing of care. The purpose of the study was to explore nurses’ experience regarding prioritization of nursing care.

**Method**

The study used a Qualitative approach with focus group interviews as the method of data collection.

**Participants:** Thirty eight nurses working in three large tertiary care teaching hospitals in India were chosen by Purposive sampling. Two of these hospitals were located in the southern region and were 800 and 1500 bedded respectively. The third hospital was from the Eastern part of the country and was 750 bedded. The interviews were conducted between July to October 2017. The inclusion criteria were: speaking in English, registered and permanent employee of the hospitals and involved in direct patient care. Nurses working in Intensive care units were excluded from the study. All participants were female nurses between the age of 23 to 44 years with professional experience varying between 2 to 17 years. They were either graduates (n=21) or held a diploma in nursing (n=17).

**Ethical considerations:** Ethical permission was sought from the Institutional Ethical Committee (IEC) of the concerned hospitals. Written and oral Informed consents were obtained from each participant, ensuring confidentiality, anonymity and their rights to refuse or withdraw at any time.

**Data Collection:** A total of six groups were interviewed. (Group A= 7; group B=6; group C=6; group D=7; group E=6; group F=6). Interviews were conducted in places of convenience of the participants and were mostly in the seminar rooms of the respective hospitals. Data saturation was achieved during the sixth focus group.

All interviews were audio recorded by an assistant and lasted between 50 to 70 minutes (Mean=63 minutes). At the onset the members were requested to share their views honestly while maintaining confidentiality and respect towards each others opinions. It was emphasized that the aim was to discuss prioritization in the context of routine patient care and not on occasions of emergencies. The members were presented with imaginary clinical situations based on previous studies and requested to discuss their own experiences similar in nature. Further discussions were guided by open ended questions.

**Data analysis:** A directed content analysis approach was used for identifying themes from the data. The steps followed were: (a) Audio recorded interviews were transcribed word by word leaving wide margins on both sides of the pages. Expressions like laughter and exclamations were written within brackets. (b) A coding scheme was developed by looking into the data from the first two interviews. Key concepts were identified and coding schemes were decided through discussion with the co author. (c) All similar codes and the supporting interview extracts were grouped in themes. The narrative data was reread with the themes in mind to check if they really fitted in the themes. All the categories were then compared to look for similarities and differences between them. (e) The emerging themes were discussed with reference to existing literature.

**Findings**

**Themes**

**Priority of Curative over carative activities**

Content analysis of focus group data brought out that nurses gave more priority to activities pertaining to patient’s cure. In general, participants expressed that they felt obliged to prioritize tasks according to the medical needs prescribed by the treating physician like administering medications, assisting in diagnostic tests and managing the chain of referrals. Rendering personal hygiene care or giving emotional support to a patient and family during a stressful diagnosis were some of the tasks admitted to be frequently missed by the participants. As expressed by two participants: *I think the most important job that I have in the hospital is to give medicines and injections. Patients get admitted for getting diagnosed and cured.*

*All my time goes in attending to the medical needs of the patient& I hardly explain anything before the tests or before discharge. I presume that they will either see Google or ask junior doctors.*

However differences in the perception of the relative importance of care versus cure were observed among
younger and older nurses. As expressed by a participant with more than 10 years of professional experience: Many a times I felt that an extra pillow under the legs, or a back rub to the old patients would have helped. These small little caring gestures are as important as the capsules and injections. But I miss them frequently.

A different view was reflected in the words of a 23 years old nurse: Anybody can care for him; his relatives can give bath, feed him and talk to him for emotional ventilation. I need to focus on his medical needs.

(b) Organizational factors effecting Prioritization

All groups had a great deal of passionate discussion and imputed the organizational work environment as significant in influencing their decision of prioritizing. Participants agreed that inadequacy of nursing resource in proportion to the workload was the predominant factor leading to their decision of prioritization.

The participants also agreed that the confusion and conflict they face regarding their role responsibilities was another important reason for them to miss many basic nursing activities. The perception that they were “too busy with non nursing tasks” was conspicuous in all the focus group discussions.

I don’t think it is my job to search for the patient’s documents when it is the doctor who misplaces them. But I spend precious time in searching.

I do not understand why the physiotherapist is never questioned when a patient is not ambulated after surgery? Is it all my responsibility?

The participants expressed their helplessness and lack of power over these organizational factors which were expressed by repeated use of phrases like “no use”, “just impossible” in their conversation. Limited power to negotiate their roles with other health team members was the dominant perception that led to a feeling of helplessness in regards to prioritization. As a participant said:

It is impossible to give care without getting disturbed by someone asking for something.

These perceived limitations lead to sense of discontentment against their supervisors and the profession in general. It is no use to tell our problems. Our leaders need to be strong and clarify what is to be done and not done by nurses.

(d) Perceived outcomes of rationing

Surprisingly very little discussion was observed regarding the outcomes of prioritizing. Participants discussed the physical effects of this phenomenon in a theoretical level as to what can happen if a particular activity of care was missed. Discussions excluded any particular real life situation of prioritized care leading to actual adverse patient outcomes.

However, discussion was mainly targeted towards the effect of prioritizing on nursing care quality. It was apparent that the decision to do prioritization led to a perceived sense of Fragmentation and Incompleteness of their work. A participant said: I take patient’s blood but seldom tell them the reports. Taking sample and then telling them the report would have been a complete job, isn’t it?

This inability to perceive a completed view of their work paved way for job strain, and dissatisfaction as expressed by two nurses: I feel pulled from all sides, patients, families, supervisors, doctors, other therapists; I never feel that I have completed everything and feel like sitting on the edge.

While giving medicines I do not even look into their eyes, with the fear that if they start talking I will have no time to complete medications. I feel so guilty.

Discussion

The findings of this Qualitative study threw light on nurses’ experience of prioritizing care and revealed that activities directly associated with patients’ cure were given more priority by nurses. It further revealed that nurses regularly rationed carative activities like emotional support, teaching, communication and hygiene care. Various studies showed that nurses rationed similar aspects of care on a regular basis.

Studies have demonstrated that omitting nursing tasks like education, hygiene and comfort care, etc have consequences on patient safety and may lead to nosocomial infection, pressure injuries, post operative complications and less readiness for self care. Thus the findings of this study shed light on the process of nursing that may contribute to poor patient safety.

Provision of emotional support, considered as an
a profession needs to be rooted in the overall ethos of the environmental framework. The study also brought out an interesting observation among the younger generation of nurses who admitted their perception of carative tasks to be unimportant. Thus the findings of this study suggest a shift in the paradigm of the nursing profession from a caring based discipline to a target oriented profession.

**Limitations**

This study was restricted to nurses’ perception of Prioritization of care through focus group interviews and there could have been chances of participants’ failure to talk about issues different from the group norms. Qualitative observation with participatory approach could have elicited a richer and purer form of data.

**Implications**

To the best of our knowledge this is the first study on Prioritization of Nursing care providing evidence to the existence of the phenomena in the Indian scenario.

**Conclusion**

Prioritizing in nursing care follows the doctrine of the existing Curative model of health care. However it is a concern for the overall quality of nursing care and patient outcomes. The phenomenon is interlinked with organizational work environment and includes multitude of stakeholders like patients and other health care providers. Moreover it seems to be causing strain on nurses’ professional experience. Thus nursing leaders in India need to acknowledge the phenomena and create scope for nurses to explicitly articulate and discuss issues related to prioritization. Through discussion with other stakeholders, nurse administrators need to deliberate and redesign nurses’ charter of duties and create a clear demarcated job description to reduce rationing care. Prioritization of nursing care can also be adopted as a real time indicator for assessing quality of care and patient safety of an organisation. Future researches to measure its level and study the full spectrum of prioritization of nursing care in India can be taken up through large multisite studies.

**Conflict of Interest:** None

**Source of Funding:** Recommended for funding by DST, GOI

**Ethical Clearance:** Obtained from the concerned
References


Efficacy of Botulinum Toxin Type A in the Treatment of Post Surgical Parotid Fistula - A Systematic Review

Kunal Gajendragadkar¹, Kalyani Bhaté², Surabhi Magoo¹, Santhoshkumar S.N³, Bhagyashree Jagtap⁴, Kshitija Sonawane⁵

¹MDS (Trainee), ²Professor, ³Professor, ⁴PG (Trainee), ⁵PG (Trainee), Dr. D. Y. Patil Vidyapeeth, Dept. of Oral & Maxillofacial Surgery, Pimpri, ⁶PG (Trainee), MIDSR Dental College and Hospital, Dept. of Oral & Maxillofacial Surgery, Latur

Abstract

Salivary fistula is a troublesome complication of parotid surgery. The treatment of this condition requires weeks before effect becomes evident. Botulinum toxin injection is a newer treatment modality. This systematic review sheds light on the efficacy of Botulinum toxin in treatment of post surgical parotid fistula. Studies comparing botulinum toxin with the other available treatment modalities as well as those studies solely using botulinum toxin are taken into consideration in the review. Electronic data search of Pub Med, Google Scholar, EMBASE, Institutional Library, Email to authors and manual search of various journals. Finally, 9 studies were included in qualitative synthesis with a total of 25 estimates. Botulinum toxin type A injections are effective in reducing the flow of saliva in treatment of post operative parotid fistula, thereby aiding in healing of the fistula. The studies had a varying variety of dose, route of administration and cycles of administration per case, making it difficult to evaluate the efficacy of Botulinium toxin in the treatment of parotid fistula. Further research focusing on streamlining the dose and delivery of the toxin must be conducted in order to establish definitive guidelines.

Keywords: Parotid Fistula, Botulinum toxin, Complications of parotid surgery.

Introduction

The development of an abnormal salivary gland drainage tract is an unfortunate complication occurring post parotid surgery. A persistent transcutaneous flow of saliva is seen in these cases. The literature unveils the post parotidectomy fistula rate to be around 4–14%¹. Sialoceles are known after-effects associated with parotid surgery and piercing injury to the parotid gland. Owing to the close anatomic relation of the buccal mucosa and Stenson’s duct, the trauma to the parotid duct is usually inevitable when operating in this region².

The discharge of saliva might occur both internally and externally, however internal fistulae usually do not require surgical intervention and usually respond well on application of pressure dressing.¹ In cases of external fistulae, the principles of management aim at the return of normal parotid function in both acute and chronic parotid injury¹.

Many authors have also described different methods of treatment, such as repeated percutaneous needle aspiration, pressure dressings, antisialagogue therapy, radiotherapy⁴, botulinum toxin⁴. The surgeries performed include duct repair, diversion of the proximal segment into the oral cavity, ligation of the proximal duct to induce atrophy of the gland, drain placement, and parotidectomy⁵.

Frequently the treatment protocol is to suppress the parotid secretions in order to allow natural healing process¹. Many agents like Hypertonic saline, scopolamine, etc. have been used in the past¹. Some
researchers also advocate the combination of one or more of these agents to achieve faster results.

Recently, botulinum toxin has gained a lot of importance in the world of cosmetics and dermatological procedures. Botulinum toxin type-A is a neurotoxin produced by *Clostridium botulinum* which inhibits the release of presynaptic acetylcholine. Majority of the secretomotor fibers to the parotid gland are cholinergic autonomic parasympathetic. Hence, botulinum toxin injections prove to be effective to reduce the salivary flow. The type-A toxin is a 2-chain polypeptide consisting of a protease enzyme which attacks one of the fusion proteins at a secretomotor or neuromuscular junction thus preventing vesicles from attaching on to the pre-synaptic membrane to release acetylcholine.

The purpose of this review is to evaluate the efficacy of the toxin in the treatment of post-surgical parotid fistula.

**Method**

**Focused Question**: How effective is Botulinum toxin type A in treatment of post-surgical parotid fistula?

**Objective**: To evaluate efficacy of Botulinum toxin type A in treatment of post surgical parotid fistula.

**Search Strategy**: A comprehensive search of literature was undertaken. The inclusion criteria was, date restriction from 2005 till date, language restriction of English and studies providing information on Botulinum toxin type A in treatment of parotid fistula. Abstracts, letters to editors, animal studies and in-vitro studies not describing method of administration of Botulinum toxin type A or its effects in detail were excluded from the study. The keywords searched were Parotid Fistula, Botulinum toxin, Complications of parotid surgery. The electronic search included Pubmed, Google Scholar, EMBASE and institutional library using keywords and their synonyms (Table1). In addition, the bibliography of included studies was hand searched to identify potentially eligible studies that were not captured by electronic search. Email communication to authors of potentially eligible studies was also done to obtain the same. In addition a manual search of Oral & Maxillofacial and ENT(Ear, Nose & throat) surgery related journals was also performed, including Journal Of Army Medical Corps, American Society for Dermatologic Surgery, Journal Of Oral Maxillofacial Surgery, International Journal of Pediatric Otorhinolaryngology, European Archives Of Otorhinolaryngology, American Journal of Otolaryngology, Annals Of Otorhinolaryngology, Oral & Maxillofacial Surgery, Laryngoscope, International Journal of Oral and Maxillofacial Surgery, British Journal of Oral and Maxillofacial Surgery and Journal of Craniomaxillofacial surgery. The reference list of identified studies on the subject were also scanned for potentially related studies.

**Data extraction**: A standard pilot form in excel sheet, for data extraction, was initially used and then all headings not applicable for the review were removed. Data extraction was done for one study and this form was reviewed by an expert and finalized (Table 2).

**Results**

**Study selection**: This systematic review followed guidelines in PRISMA (Preferred Reporting Items for systematic Reviews and Meta-analysis) statement. Two hundred and sixty studies were obtained from information sources. The studies were screened and 236 studies were excluded for not meeting the eligibility criteria. Out of the remaining 24 studies, 15 were removed for being duplicates. Thus, total 9 studies were included in qualitative synthesis with a total of 25 estimates.

**Discussion**

In the 1820’s, Dr. Justinus Kerner started studying a batch of blood sausages which were responsible for the death of many Germans. He however could not isolate any factor and he called it “wurstgift” (German for sausage poison). In the 1890’s seventy years after Kerner’s experiments, Dr. Emile Pierre van Ermengem of Belgium investigated an outbreak of botulism following a funeral dinner which killed three people and paralyzed 23. Dr. Emile connected botulism to a spore-forming bacterium and named *Bacillus botulinus* which was later renamed as *Clostridium botulinum*.

**Study Characteristics**: Nine case reports and case series which satisfied the inclusion criteria were selected for this study. (Marchese-Ragona R et al.,2005; Marchese-Ragona R et al.,2006; Lim Y et al.,2007; Hill S et al.,2007; Hatzis G et al.,2007; Laskawi R et al.,2013; Gok G et al.,2013; Tighe D et al.,2014; Melville J et al.,2016).
Characteristics of trial settings, investigators and methods:

Five studies were case reports, three were case series while one was a technical note, which were conducted in Italy, Korea, New Zealand, USA and England respectively. The settings for the patient treatments were OPD in 4 studies and IPD in 2 studies. In 3 studies, the setting was not mentioned clearly.

Characteristics of Participants:

A total of 25 participants were treated in nine studies. The age of the participants ranged from 39 to 88 years and included both genders and both side parotid glands. The chief complaint of the patients was salivary discharge and parotid fistula following surgery. The reasons for surgery were Mucoepidermoid carcinoma, Squamous cell carcinoma, Warthin’s tumour, Acinic cell carcinoma, parapharyngeal tumour, ulcerated basal cell carcinoma, Cystadenolymphoma, Undefined infiltrative process, Pleomorphic adenoma, Cyst, self-inflicted shotgun wound, Traumatic fracture of the mandibular condyle.

The surgeries performed were left lateral parotidectomy in 4 patients, mass excision in 1 patient, wide local excision in 1 patient, Mohs resection in 1 patient, superficial parotidectomy in 1 patient, partial superficial parotidectomy in 1 patient, reparative surgery in 1 patient, Open reduction and internal fixation of mandibular condyle in 2 patients, ablation and immediate reconstruction in 3 patients.

The approach for the surgeries was endaural approach in 1 patient, extra oral approach in 15 patients, trans-parotidocervical approach in 1 patient, rotating island pedicle flap in 1 patient, Retromandibular trans parotid approach in 2 patients, and for the patients who underwent microvascular reconstruction, Anterolateral thigh free flap in 2 patients, Radial forearm free flap in 1 patient.

Characteristics of interventions:

As per our inclusion criteria studies using Botulinum toxin type A for the treatment of parotid fistula were selected.

The Botox was used in different quantities in different patients ranging from 10 IU to 225 IU per cycle.

The number of cycles of injection required for complete treatment varied from 1 cycle in 15 patients, 2 cycles in 7 patients and 3 cycles in 3 patients.

The site of injection varied from Substance of the parotid gland, Superficial lobe of the parotid and in proximity to the fistulous tract.

Some of the studies used specific method of delivery of the toxin i.e. Ultrasound guided (USG) 22G needles, 27G Teflon coated Electromyography (EMG) needles, Tuberculin syringe, some authors also dissolved the toxin in saline before injection.

Characteristics of the outcome measures:

All studies were evaluated for closure of parotid fistula with Botulinum toxin type A injection. Time required for stoppage of salivary flow ranged from 24 hours to 2 weeks. In 1 patient the salivary flow stopped in 24 hours, in 2 patients it took 48 hours. Seventy-two hours were required for stoppage of salivary flow in 2 patients. It took 2 weeks in 3 patients, 7 days in 1 patient while in 2 patients the time required for stoppage of salivary flow was unclear.

Time required for closure ranged from 1 week to 21 months with the closure seen in 1 week in 1 patient, 3 weeks in 3 patients, 3 patients in 1 month, 2 patients in 2 months, 1 patient in 3 months, 1 patient in 4 months, 2 patients in 5 months, 1 patient in 9 months, 1 patient in 14 months, 1 patient in 18 months and 1 patient in 21 months.

Out of the 25 patients only one patient discontinued the Botox treatment as no closure of fistula was seen.

No patient faced any untoward complication from Botox injection apart from a few complaints of dryness of mouth for a short period of time in few patients.
Table 1: Search Strategies

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Search strategy</th>
<th>Number of Studies</th>
<th>Number of selected Studies</th>
<th>Number of Studies after duplicate removal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Parotid fistula AND BOTOX</td>
<td>5</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Parotid fistula AND OnaBotulinum toxin</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Parotid fistula AND Treatment of parotid fistula</td>
<td>166</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Botulinum toxin AND Salivary fistula</td>
<td>31</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Botulinum toxin AND Complications of parotid surgery</td>
<td>57</td>
<td>6</td>
<td>6</td>
</tr>
</tbody>
</table>

**Conclusion**

Botulinum toxin therapy is useful in reducing saliva production in patients with post operative parotid fistula\(^{14}\). Though it does not directly help in the healing of parotid fistula, the reduction of the salivary flow indirectly aids in healing of parotid fistula, by decreasing parasympathetic activity of salivary glands.

The decrease of salivary flow occurring shortly after the injection, has been well documented by many authors. Nonetheless, it should not be equated with the end of wound healing. Nevertheless, this is a very important effect since it alleviates the patient’s symptoms and reduces the discomfort associated with saliva draining through the fistula and running down the cheek and neck. Even if fistula closure cannot be achieved, this is still a very positive effect of the Botulinum toxin injection since it eliminates the visible social stigma\(^{14}\). Authors have performed the injections in a wide range of doses and cycles of administration. However, Melville J, et.al have achieved the reduction in salivary flow as well as the closure of the fistula in the shortest duration with minimum dose of the toxin, i.e., 40 IU in 2 cycles achieved stoppage of salivation in 2 weeks and closure of fistula in 3 weeks. So, we recommend this dose and cycle for closure of parotid fistula. The ultimate closure of parotid fistula depends on multiple factors like radiotherapy, size of the reconstruction flap, overall health of the patient as well as age of the patient.

The cost of the product however is higher than traditional methods and this is probably the biggest hurdle in developing countries like India. Moreover sometimes repeated application is needed thereby increasing the expenditure of the treatment.

Botulinum toxin injection is well tolerated, can be given rapidly in outpatient setting and can be repeated as needed. One of the most disturbing side effect of Botulinum toxin injection maybe post injection paralysis of facial nerve\(^{15}\). The use of ultrasound guidance allows avoidance of damage to intra parotid vessels and also the facial nerve. It also allows delivery of the toxin as close to the fistula as possible\(^{13}\).

**Funding:** This study was not funded.

**Conflict of Interests:** None

**Ethical approval:** Not required.

**Patient’s consent:** Not required.

**References**

2. Melville J C, Stackowicz D J, Jundt J S, Shum J W. Use of Botox(OnabotulinumtoxinA) for the Treatment of Parotid Sialocele and Fistula...


Analysis of Factors Influencing Medical Tourism in India Chennai and its Impacts

J. Revathi1, S. Jansi Rani2
1Phd Research Scholar; 2Associate Professor, Department of Economics, VISTAS, Chennai

Abstract

Emerging countries like India has abundant opportunity because it built its own health care and offer high quality treatment at low cost, India adopts western medicine and still practicing Indigenous system also, excellent destination for the medical tourist because of exotic beaches, mountains, pilgrimage places, most importantly is get accreditation from NABH, JCI to offer the quality of treatment and use state of art in technology ,skilled professional these attracts the foreign patients to India,especially Tamil Nadu is the hub of medical tourist many reputed hospital and star hotels are available and transportation makes it easier, service provider also offer the health packages and provides information to their need, tourism and medical tourism are labour oriented, generally India have large pool of professionals, paramedical, these things medical tourism became profit earning industry in India.

Keywords: MT- Medical Tourism, JCI-International Joint commission, SMAC(social, mobile, analytic, cloud), Society for International Health Care Accreditation (SOFIHA)

Introduction

Health Care- India is known for heritage of health science, The Surgical skills were clearly mentioned in Ayurveda by Charaka, Jivaka, etc... History of hospitals can be traced back in the Ashoka period(320BC), Unani was introduced in Mughal emperor period (1000-1500AD), Allopathy took diverse popularity before that people relied Indigenous only .The first Allopathy Hospital was built in 1664 at Madras.18

Wellness tourism origins in the period of 4200 BC to recover from illness to take bathing in thermal spring. In Sumaria, medical tourism originated in 1500 BC in Greek to honor of their god to laying stone temple. Currently more than 50 developing countries engaging in medical tourism like nations from Asia, South America, and Africa1

India as consider one among the global leader in medical tourism. It competes with other countries like Thai and Singapore. the application of 7p’s makes India to be in top rank, 2015 statistic said 18% of medical tourist came to India,so effective medical market strategy seeks the International patients to came India, and also India provide diversified medical procedures Ayurveda, yoga, Fertility treatment, etc... The main factor for going for emerging countries are the elective treatment may not available in their home country or too much of cost , and important thing is travelling can rejuvenate mentally and physically gives mixes leisure and relaxation with the treatment, India offers variety of alternate medicine like Ayurveda, Naturopathy Reiki, Homoeopathy etc.. Obviously India became destination for the medical travellers. Apart from this the qualitative and quantitative shifts in patients moves to developing countries,quality of treatment provided for low cost , some of the treatment are cardiovascular, Orthopedics, Fertility. The comparative cost benefits are larger in India [65-90%]. for this achievement they use traditional marketing trend like conventional products, the patients are consider as target audience, state of art in technology. Medical marketing not only attracts the patients but also build the brand of the hospitals2.

Objective of the study

Infrastructure development

Push and Pull factors, influencing medical tourism

Impacts of Technology influence the medical
Accreditation and Branding the factors to promote the medical tourism

Infrastructure development

Chennai is the Capital of Tamil Nadu, largest city in the state, third busiest International airports in India, and second busiest sea port container hub, extensive road network, Infrastructure development Index Chennai gets second place, it is Industrialized as well as metropolitan city, eleventh largest state in India, second largest tourism industry.  

Tamil Nadu known for its health care madras medical college was started at 1835 public health system is best in the country, medical center and research Institute are avail in Tamil Nadu, the major cities of Chennai, Madurai, Vellore, and Coimbatore offers exponential medical collaboration with Japan (Japan International Agency for Cooperation) to make Chennai as smart city, Japan is known for world class infrastructure and transportation system, without making any disturbance of Chennai’s heritage, the development taking place. Japan provides the financial support, Prime Minister Narendra Modi has a plan to build 100 smart cities in the country, Japan also assist to build the smart city, for this improvement going to standardized the drainage system, transportation system, waste management system etc., Japan converted Kyoto a model without any disturbance to its old heritage they convert in to smart city. In infrastructure development on expressway to Chennai to Bangalore, the cost of the project is 20,000 crore, and extend the suburban areas, and also expand the six laying road ways Tamil Nadu get 1 lakh crore for infrastructure project.

Push & Pull factors which the medical tourism

People club travel and medical treatment together, and Whittaker differentiate medical tourism and health tourism. In Medical tourism they came for elective surgeries and health tourism. The rejuvenation procedure like spa message, alternate treatment takes place.

In India the product which they sold under medical tourism are wellness, rehabilitation, treatments, Ayurveda is birth place of India, which is known for natural system for curative purpose, and treatment is the first preference to the patients, the cost of the treatment is high in developed countries like UK, USA these reasons pull the patients to move emerging countries, so the alternate treatment and low cost are make them to take decision, and India is in nascent stage but it has strong potential to grow in future, Medical tourism is a global business.

Primary factors for growing MT in developing countries are, high level uninsured patients in USA, UK lack of private healthcare and long waiting time, In Japan Pressure of ageing population, long stay in hospitals, Dearth of sufficient doctors, and cost effectiveness, Elective surgery, insufficient health care in developing and under developing countries. Secondary factors-Secular shifts [developed and developing countries], working vs. leisure time, Population, Increasing demand of quality, and Individualization. Socio economic factors, Flexi working time, Higher income, More leisure time, Changing value of holidays, Changing life style, Growing political and medical segment, Many medical tourism companies/facilitators, end-end medical tourism providers. Cost Advantage: The price discrimination for the procedure and cost advantages are the important factor to motivate the people to go to the other countries.

The countries like India, Singapore, Philippines, Greece are promoting the medical tourism because medical tourism became huge profit earning Industry in the world, even though India joined very later, but gets popularity very soon because of the reasons are long waiting time, shortage of professionals, lack of support from family side apart from that the cost of the treatment is huge in developed countries, in UK NHS support service cannot provide so obviously they search for the alternate source, as well as cost effective in emerging countries, The highlight of choosing India as the destination place for the treatment is quality of treatment, no language problem, the cost of the open heart surgery is very less compare to US and UK. Medical tourist get packages it include rejuvenation therapies, hotels, site visits post-operative vacations.

Impacts of Technology:

The most important thing in MT is payment security, to health providers and also medical travellers. The Digital payment system is problem solving to both of them. The health care providers need to set all service along with related service providers are integrated, so the transparency helps the economy to flourish.
Technology is not the solution for the health care but it enables to provide quality of health provide by the providers, so Health care adopts the digital technology for this success they create mobile apps to adopt and government also takes steps for the digital technology. Mobile apps enable the private consultation with doctors it offers on line videos. SMA
cenables the uncover drive. It helps the customer to interact in socialmedia, some apps able to measure the body metrics. And save the information’s in cloud platform, from that they analyses, know the consumer preference. And cloud gives way to access the technology and data for the business.

Cloud helps the Health care organization more focused on their core activities; it. This accurate information provides confidence in emergency .it helps to reduce the time, minimizing insurance coverage, etc. the cloud technology is easy to access. Moreover the cloud technology helps to reduce the utilization of resources, and also to improve the patients safety in the hospital, the hospital design should be evidence based [EBD] for this the design should be evaluated by users from different disciplines. EBD suggest the health care support .and the design cover several stages. These are detailed in hospitals in Kolkata. Midmark An Indian company introduced motorized bed ‘Electra’ for patients, it aims to enhance the patients recovery and efficiency of caregiver,and matches the world class standard, and India entering in to global market ,specialty are the cardiac chair are achieved easily.

Collective diagnostic laboratory in India, Neuberg is a Diagnostic laboratory which is located in Bangalore ,and is managed by Dr.G.S.K.Velu the founder, is the very first global pathology ,laboratory consortium, four Nations like India, Srilanka, South Africa, and UAE,are joined together formed this setup .This diagnostics is affordable to people across the globe, Neuberg have three world class reference laboratory, in Bangalore, Ahmadabad, Durban [South Africa], they have advanced technique along with total lab automation and big data analytics tools, and it is supported by world class laboratory system. They had done more than 5000 pathology test and it empowers the Indian health care service.

Wearable help the patient’s activities, now it used to common people also like measure basic health parameter, BP, Heart rate, etc...In India now 30 crore valued wearable are used and it is expected to increase more. A wristwatch acts as a personal emergency response system; GPS helps to cover remote server.

Accreditation and branding the factors to promote the medical tourism

The deciding factors of MT are Accreditation certificate from JCI, Insurance coverage, Hospitals and Doctors must have board certified, and the most important thing is Accreditation. It’s a voluntary process to develop the standard to ensure safe delivery of health service, it was set by the health professional, to maintain the quality, JCI is best known accreditation group in US. JCI inspects the hospitals then only gives the accreditation certificate. SOFIHA aims to provide safe hospital environment to the patients. These factors influence the patients to come India.

Branding is essential to promote high quality, of Indian Hospitals in International Markets, Low cost compare to developed countries, good infrastructure facilities, like proper sanitation, roads, power back up, accommodation, standards in pricing of procedures in Indian hospitals. This enables market leaders to generate trust among the medical tourist health care is more important to build the brand location like city ,region, country to attract the international patients, stakeholders and partners develop a network synergies , hotels and resorts important in pre-post surgeries India has many hospitals and clinics, Some Indian health care providers provide hospitals and their branches at other countries for the patients who has to get the treatment from India can go for follow up treatment and other purpose, so healthcare providers in India has an advantage to compare to their competitors due to high standards treatments and services offered to patients at a very competitive price and provide valuable information to the patients; this helps them to take informed decision in the available medical treatment. Quality assurance, treatment and service descriptions procedures are provide in internet to attract patients. Most of the healthcare service providers generally need the help of facilitators to promote.

Benefits of MT in India

Through medical tourism the growth of commercial value is exponential, majority of employment is generated [60%] helps to up gradation of facilities, helps to gain knowledge due to different problems of patients, and it helps to learn new techniques in complicated diseases, and makes the organization globally competitive and
also makes friendly atmosphere, main things is improve the Business\textsuperscript{10}

India provide unique basket of health care:

India practicing yoga more than 5000 years ago, people from other countries came to India to learn yoga as well as other alternate medicine and India gets high reputation in cultural, medical and spiritual progress apart from this western medicine became very popular. That is the reason India became destination for the medical travellers \textsuperscript{17}. Tamil Nadu is home land of siddha is consider best alternate medicine, people gets awareness about the healing system, to improve the alternate systems like siddha, government also set up a eco-friendly farm house, by the ministry of tourism\textsuperscript{13}

Government participation:

To promote MT, Ministry of Tourism and The Ministry of Health and Family Welfare jointly formed a force to promote the Health Destinations, this helps to know the foreign patients to choose the places and also provide the infrastructure, and health care expertise. The ultimate aim is to develop the domestic and international markets, the very important thing is to streamline the immigration process government provide the medical visitor and introduce the medical visa [M-visa] this is only for specific period to the foreign patients to get the medical treatment in India, moreover Ministry of Tourism to expand its market development [MDA] to get the International joint commission accreditation [JCI] and National Accreditation Board of Hospitals(NABH) \textsuperscript{6}

Ministry of tourism takes initiative steps to position the brand, conduct exhibition for International travel exhibition, fiscal incentives to medical tourism operators, [providers] ‘Indian Ministry of Commerce created the ‘The India Brand Equity Fund ‘to provide support to the exporters. To set an International standard, Enhance the infrastructure in the cities like Bangalore and Hyderabad, Effective market exercise taken in branding the country\textsuperscript{1}

Impacts of Medical Tourism

Medical tourism is considering conventional tourism. Hotels and travels are byproduct. Many hospitals tie up with the hotels and travel through they arrange and pick up- drops, post surgeries they can arrange the site visits. And provide accommodation in hotels near by the hospitals. It is helpful to the person who accompanied with the patients feel comfortable to stay with them. They booked three star and five star hotel for advanced booking, moreover the resorts near by the hospital also tied up with the hospitals post-surgery they go and enjoy the trip and its very much useful to patients who needs follow up treatments and also can go rejuvenation process like spa’s yoga, etc….These are all cascading effect of medical tourism money being spend throughout host country in many areas it generate the employment\textsuperscript{7}

**Conclusion**

Chennai is called Health capital of India. Internet provides all available information about the Destination countries, hospitals, treatment which they provide, star hotels, accommodations, and other facilities, so patients can choose their wish. The reason is quality accredited hospitals, and skilled doctors available in Chennai. So the star hotels and exotic places attracts the foreign patients and our Ingenious system added value to the medical tourism, nowadays people get more awareness about the alternate medicine, so India has large potential to go further in this market all these things made possible through internet, and patients also gets satisfaction from treatment as well as spend their leisure time in destination countries.

**Ethical Clearance:** Nil

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Radicular Cyst Associated with a Primary Molar: A Case Report

Rose Maria Joseph, Karuna Y M, Dharnappa Poojary, Ashwin P Rao, Anupama Nayak P

1Post graduate Student, 2Assistant Professor, Department of Paedodontics and Preventive Dentistry, 3Associate Professor, Department of Oral and Maxillofacial Surgery, 4Associate Professor, 5Assistant Professor, Department of Paedodontics and Preventive Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Manipal

Abstract

Radicular cysts are among the most commonly occurring cystic lesions of the jaw, but are relatively rare in the primary dentition. This report presents a case of radicular cyst associated with a grossly carious primary molar. The treatment consisted of enucleation of the cystic sac and extraction of the involved primary teeth with preservation of the permanent tooth bud. At one year follow up, patient showed a complete healing, along with the eruption of the permanent successor. However, the erupted tooth had developmental defects.

Key words: Primary molar, radicular cyst, surgical enucleation

Introduction

Occurrence of radicular cysts are relatively rare in the primary dentition1. In the primary dentition their prevalence is only 0.5-3.3% of the total number of radicular cysts seen in both the primary and permanent dentition1,2. In children they are mostly seen associated with mandibular primary molars3.

Radicular cysts arise from epithelial remnants of the periodontal ligament as a result of inflammation and inflammatory cell infiltration due to pulp necrosis. These cysts are commonly found surrounding the apex of the affected tooth2,3. Dental caries is the most frequent etiologic factor suggested for radicular cysts4.

In most cases these cysts are slow growing and asymptomatic unless secondarily infected4. However, they may rarely cause expansion of the cortical plates and delayed eruption, malposition and enamel defects of the developing permanent successors when they are seen in primary dentition1,5. Surgical enucleation of the cyst with extraction of the associated primary teeth and preservation of the permanent tooth bud is the treatment of choice when the cystic lesion is small in size1,6. Marsupialisation for decompression of the lesion is suggested in case of larger cysts4. Rate of reoccurrence is low following adequate treatment4. Present case describes the surgical enucleation of a radicular cyst associated with a primary molar, along with the post treatment outcomes at one year follow up.

Case report

A 7-year-old female patient reported to the Department of Paedodontics and Preventive Dentistry, MCODS, Mangalore with a chief complaint of multiple decayed teeth (Fig. 1a and 1b). No history of pain was reported with any of the decayed teeth. No other intraoral or extraoral abnormalities were evident during clinical examination.

An orthopantamogram (OPG) was advised due to the presence of multiple decayed teeth in all four quadrants. OPG revealed root stumps in relation to mandibular primary right second molar (85), with a unilocular well defined peri-radicular radiolucency of
size 15mm × 10mm extending from the distal aspect of mandibular primary right first molar (84) and tooth bud of mandibular right first premolar (44) to the mesial aspect of permanent mandibular right first molar (46) involving the tooth bud of mandibular right second premolar (45) and deflecting its position (Fig. 2).

Based on the clinical and radiographic findings, a provisional diagnosis of radicular cyst was made in relation to root stumps of 85. Surgical enucleation of the cyst following extraction of 85 was planned under general anesthesia (GA) after consulting with the Department of Oral and Maxillofacial Surgery and after obtaining informed consent from the parent. Following enucleation the cyst specimen was sent for histopathological examination, which revealed the presence of connective tissue capsule with dense collagen bundles and moderate amount of inflammatory cell infiltration. Patient was recalled after one week for suture removal and was then followed up for one year.

Recall visit at 3 months showed complete healing of the surgical wound and erupting 45, which had hypoplastic defects of the crown clinically and abnormal root development radiographically (Fig 3a and 3b). Clinical examination at 1 year follow up showed continued eruption of 45 (Fig 4) and the OPG showed thickening of the root canal walls of 45, while the root form still remained abnormal (Fig 5).

**Discussion**

The comparatively low prevalence of radicular cyst in relation to primary teeth is because pulpal and periapical infections in deciduous teeth tend to drain more readily than those of permanent teeth. Radicular cysts are usually asymptomatic till secondarily infected and are diagnosed during routine radiographs.

The sequelae of an untreated or undiagnosed radicular cyst of a primary tooth could be harmful to the patient’s secondary dentition, due to its anatomical positioning. The sequelae may include delayed eruption, malposition or enamel defects of the permanent successor. In the present case the cystic lesion had caused deflection of the permanent tooth bud as noted in the pre operative radiograph and hypoplastic defects along with abnormal root development involving 45 as noted during the follow up visits.

In a case report by Narsapur et al the radicular cyst had deflected the permanent tooth bud to the base of the mandible because of which it was extracted. Spontaneous realignment of deflected permanent tooth buds following cyst enucleation has also been mentioned in the literature, as observed in the present case. Gupta et al reported malformation of the permanent tooth as the result of a large radicular cyst in the primary molars in maxilla. The authors removed the malformed tooth along with enucleation of the involved cyst. In our case the tooth successfully erupted into the oral cavity inspite of hypoplastic defects and abnormal root development. Abnormal root development was also reported by McDonnell et al wherein the permanent successor had partially erupted as a sequelae to carious primary predecessor owing to the effect of persistent infection.

Most frequently encountered cysts in a mixed dentition are either a radicular cyst associated with a primary molar or a dentigerous cyst in association with an unerupted premolar. According to a study by Manekar et al in most cases of dentigerous cyst the preceeding primary tooth will be vital as opposed to a carious and non-vital primary tooth found in radicular cysts. The bony expansion resulting from the cystic lesion is very limited in case of radicular cysts. Periapical cementoosseous dysplasia (PCOD) or traumatic bone cyst may also be difficult to distinguish radiographically from a radicular cyst. But, like in the case of dentigerous cyst the primary tooth pulp is vital and healthy in these conditions too. In the present case, the cystic lesion was associated with grossly carious and non vital 85 with minimal bony expansion. These observations along with the radiographic examination helped us in making a diagnosis of radicular cyst in relation to 85.

**Fig 1a and 1b. Preoperative occlusal view of maxillary and mandibular teeth respectively**
Conclusion

Radicular cyst of a primary tooth may have damaging sequelae in the form of affecting the underlying developing permanent tooth bud, if it goes undiagnosed and untreated. Thus, early diagnosis and management of such pathologies are of paramount importance.

Conflict of Interest: NIL

Source of Funding: NIL

Acknowledgement: NIL

Ethical Clearance: Ethical clearance taken from Institutional Ethics Committee (Reference No: 18154)

References


Functional Outcome of Multiple Plate Fixation of Tibial Plateau Fractures based on New “Three-Column Concept” Fracture Classification

Mahipat Singh, Deepinder Chaudhary, Manrattan Bhathal, Neha Baiswar, Divyant Randhawa, Jayant Randhawa, Vivek Kumar Madhur

1Joint Replacement and Reconstruction Unit, Sir Ganga Ram Hospital, New Delhi, 2Consultant department of anaesthesia, B L Kapoor Hospital, New Delhi, 3DNB Obstetrics and Gynaecology, Sanjay Gandhi Memorial Hospital, New Delhi, 4Master of Medicine, National Pirogov Memorial Medical University, Vinnytsya (Ukraine), 5B.Sc. Health Sciences, Trent University, Peterborough, ON Canada, 6Senior Resident Orthopaedics, RIMS, Ranchi

Abstract

Introduction: Commination of articular surfaces and metaphyseal region, extensive soft tissue injuries, infection and risk of compartment syndrome are the challenging factors in management of Tibial Plateau Fractures. Various modalities like cast, traction, external fixation and open reduction and internal fixation with plating are the available options for treating such complex fractures. In this study we prospectively analysed the functional outcome of fixation of tibial plateau fractures based on Luo et al’s “Three-Column Concept” fracture classification.

Materials and Method: In this study, twenty patients with complex “three-column tibial plateau fracture” were followed up prospectively clinically and radiologically for a duration of 6 months. After an initial conservative management all patients underwent buttress and supporting multiple plate fixation depending on the specific column involvement of proximal tibia. Final outcome assessment was done with IKDC 2000 & Functional and Subjective Knee society score (KSS) based on functional outcome, fracture union, articular congruity and deformities, if any.

Result: 90% (18/20) of patients showed excellent results according to objective and subjective knee society scoring, whereas 10% (2/20) developed complications postoperatively.

Conclusion: The results of this study concluded that multiple plate stabilization of complex “three-column tibial plateau fracture” is an excellent modality of treatment with minimal complication rate, of these otherwise difficult to manage fractures with other traditional methods.

Keywords: Three-Column Tibial Plateau Fracture, Multiple Plate Stabilization.

Introduction

Knee Injuries sustained in high energy trauma is invariably a combination of complex fracture configuration of proximal tibia along with severe soft tissue injuries due to axial loading combined with valgus, varus and rotational stresses.

Proper implant selection and surgical technique plays an important role to maintain joint stability, congruity, and alignment without much soft tissue dissection thereby achieving early mobilization and preventing late degenerative arthritic changes and stiffness. Open reduction and internal fixation with multiple plating is the corner stone in the management of these otherwise difficult to manage three-column fractures.
proximal tibial fractures. With this treatment modality proximal tibial native anatomy is restored with resultant excellent postoperative functional results.

Posterior tibial plateau fracture (PTPF) is a relatively uncommon injury, with an incidence of 28.8%\textsuperscript{4}. Among the available classifications, Schatzker and AO Classification are widely used, however, these classifications restrict themselves to fracture anatomy and do not help much in deciding the approach and predicting the outcomes. Luo’s Classification added a new dimension by describing the posteromedial and posterolateral column and propounded the “three column concept” of articular area\textsuperscript{5}. Occurrence of a posteromedial fragment was observed in nearly one third of the bicondylar tibial plateau fractures evaluated by CT scan by Barei et al\textsuperscript{6}. The morphologic features of this fragment has clinical implications when using currently available laterally applied fixed-angle screw/plate implants to stabilize these injuries\textsuperscript{7}.

Recent surge in exploring these fractures which have posterior tibial condyle fracture through posterior approaches like Direct posterior, Burke’s, Lobenhoffer have enabled surgeons to tackle these difficult fractures more accurately\textsuperscript{8}.

**Material and Method**

In this prospective study 20 skeltally mature patients were followed up who underwent open reduction internal fixation with multiple plate stabilization of complex three column proximal tibial fracture as classified by Luo et al\textsuperscript{(5)}. Patients with pre-existing deformity, all open fractures, polytrauma, pathological fractures, fractures with ipsilateral neuro-vascular deficit, floating knee injuries or those associated with patella fractures, skeletal immaturity and fractures older than 4 weeks were excluded from this study.

Preoperatively, depending on severity of injury patients were managed conservatively in the form of immobilization and elevation of involved limb with skeletal traction or long leg above knee slab till the subsidence of proximal leg swelling and improvement of the skin condition. Once the soft tissues were amenable to surgical intervention, definitive three-column stabilization of the involved fractured proximal tibia was planned.

Luo et al’s “Three-column concept” classification system which divides proximal tibial plateau fractures into lateral, medial and posterior column as seen on axial plain CT scan images and 3-D reconstruction was used as our standard classification for all our patients\textsuperscript{5,9}.

In our study, we exclusively included Luo et al’s three-column fracture types. The column borders are demarcated by four points on the transversal CT-image: point O represents the artificial axis of the 3 columns and is defined as the midpoint between the two tibial spines; point A is found on the anterior tibial tuberosity and, when connected to point O, it divides the lateral and medial column; point B represents the posteromedial ridge of the tibial plateau; point C represents the most anterior border of the fibular head, when connected to point O, divides the lateral and posterior column(figure-1).

A combination of 4.5 mm locking plates, dynamic compression plates (DCPs) and precontoured periarticular locking compression plates were used as a buttress on the compressible side and supporting plates on the tensile side of the three column tibial plateau fracture. Lateral and posteromedial/reversed L shaped approaches to proximal tibia were used.
Post-operatively, Ankle pumps, active quadriceps and toe movements were allowed immediately. Partial weight bearing was initiated at 8 weeks and full weight bearing was allowed at 12 weeks post-operative after clinical and radiological confirmation of bone healing.

All patients were followed up at 2 weeks interval for first 6 weeks and there after at 4 weekly interval for a total 6 months, postoperatively. International Knee Documentation Committee (IKDC 2000) subjective knee evaluation and objective functional Knee Society Score (KSS) were used to assess post-operative knee function in all our cases. At 24 weeks follow up, all patients were subjected to CT scanogram and x ray evaluation to assess for fracture healing, articular congruity, limb alignment and any remanent deformity. Clinically, knee was evaluated for Range of movement, Extensor lag, Flexion deficit, pain scores, knee instabilities and deformities.

Result

In this study 20 patients with three-column proximal tibial fracture according to Luo et al’s “three-column concept”classification were followed up prospectively clinically and radiologically for a duration of 6 months.

As sited in table-1, patients age ranged from 20 to 60 years, with mean age of 41.45±10.46 years. 19(95%) patients were male, while 01(5%) was female. Right limb was involved in 12 patients(60%) whereas left was involved in 8 patients(40%).19 injuries(95%) were due to high energy trauma because of road traffic accidents and 01 (5%) was due to sports injury.

18 patients (90%) were surgically managed by a combination of one 4.5 mm locking or dynamic compression plate (DCP) used as a buttress plate on the compression side and one low profile 1/3rd semitubular plate or precontoured periarticular locking plate used as supporting plate on tension side of the three-column fracture of tibial plateau. In 2 patients (10%) a
combination of two buttress plates and one supporting plate was used for adequate three column proximal tibial fracture stabilization. 18 patients (90%) achieved excellent (80-100), 1 (5%) achieved good (70-79), 1 (5%) achieved fair (60-69) objective knee score and. 18 patients (90%) achieved excellent (80-100), 2 (10%) achieved good (70-79) subjective knee score.

As listed in table-2, Operation time ranged from 90 to 120 minutes with average blood loss of 147+ 37.57 ml. Post operative hospitalisation was an average 9.00+ 2.66 days. Fracture union was achieved in all patients with average union time of 15.85±2.94 weeks. Mean International Knee Documentation Committee (IKDC) score was 68.26+_8.00. Mean range of knee flexion was 115 degrees.

In our study, complications were observed in 2 patients (10%). 1 patient (5%) developed superficial wound infection one week postoperatively which was successfully managed conservatively. 1 patient(5%) complained of hardware irritation on the lateral side, necessitating removal of lateral supporting plate at 12 weeks post-operatively.

Discussion

Comparable with other studies we had high male/female ratio (19:1)\(^3\). This can be attributed to higher number of males involved in high energy trauma than females. The average operation time of 120.50+ 21.34 minutes in this study is on the higher side as compared to other studies where other traditional methods were used\(^7\). Our three-column proximal tibial stabilization technique had a favourable immediate post-operative outcome with average hospitalisation of 9.00+ 2.66 days and average blood loss of 147+ 37.57 ml. Final radiological and functional outcome; average union time of 15.85+ 2.94 weeks, average IKDC score of 68.26+ 8.00 and average ROM of 115 degrees was comparable with similar studies\(^3\).

As is true for any successful fracture management the first prerequisite is a standardised and descriptive classification system of the involved fracture. The Luo et al’s “three-column concept” tibial plateau fracture classification system\(^6\) based on CT scan evaluation\(^9,10,11\) of the proximal tibia has overcome the inherent falacies in management of these fractures especially involving the posterior column\(^11,12\), associated with other common classification system like Schatzker and AO\(^13\).

A well-designed preoperative surgical strategy which would precisely reduce the fracture fragments providing a congruent joint surface along with minimal soft tissue handling holds the key in successful management of these otherwise difficult to treat fractures. A number of treatment modalities with their share of favourable outcomes and complications have been tried such as Simple Skin Traction, Cast Immobilization, External Skeletal Fixation, Minimally Invasive Techniques (LISS system), Arthroscopically Assisted Fixation, Minimal Percutaneous Pinning and Open Reduction and Internal Fixation with available implants\(^1,7,14\).

Conservative treatment of proximal tibial plateau fractures are not favoured anymore because of prolonged

### Table-1: Demographic data of the patients with posterior tibial plateau fractures (PTPF) (N = 20)

<table>
<thead>
<tr>
<th>No.of patients</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male/female ratio</td>
<td>19/1</td>
</tr>
<tr>
<td>Mean age (in years)</td>
<td>41.45+_10.46 (20-60)</td>
</tr>
<tr>
<td>Injured limb(Right/Left)</td>
<td>12/8</td>
</tr>
<tr>
<td>Trauma mechanism</td>
<td>19 (RTA) / 1 (SPORT INJURY)</td>
</tr>
</tbody>
</table>

### Table-2: Perioperative parameters and postoperative functional scores in each group of posterior tibial plateau fractures (total N = 20)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation time (mins)</td>
<td>120.50+ 21.34 (90-180)</td>
</tr>
<tr>
<td>Blood loss (ml)</td>
<td>147.00+ 37.57(90-250)</td>
</tr>
<tr>
<td>Post-op Hospitalization period (days)</td>
<td>9.00+ 2.66 (5-14)</td>
</tr>
<tr>
<td>Union time(mean) weeks</td>
<td>15.85+ 2.94</td>
</tr>
<tr>
<td>IKDC score(mean)%</td>
<td>68.26+ 8.00 (60-86.2)</td>
</tr>
<tr>
<td>ROM (mean)degree</td>
<td>115(0-125)</td>
</tr>
</tbody>
</table>
immobilization and poor functional outcome\textsuperscript{19}. Though, Arthroscopically assisted fixation and minimal percutaneous pinning have shown good results but find use only in limited situations like simple split depression and local compression fractures\textsuperscript{19}. Pin tract infection and prolonged course of treatment has made Hybrid fixation system out of reckoning\textsuperscript{20,21}. However, some studies have reported favourable outcome with open lateral plating and medial uniplaner fixator in complex bicondylar fractures \textsuperscript{21}. Minimally invasive techniques (LISS system)\textsuperscript{22} by their inherent property of preserving soft tissues have given good results but because of limited exposure in these techniques the intraarticular congruency is invariably not achieved leading to early osteoarthritic changes.

In the present study a new concept of three-column fracture fixation as proposed by Luo et al was used to fix comminuted tibial plateau fractures with a buttress plate on compressile side and with low profile supporting plate on the tensile side instead of rigid dual plate fixation. A main buttressing plate is placed first to reconstruct the posteromedial ridge followed by an anterolateral supporting plate which is placed to prevent over reduction. In 18 patients (90\%) we could achieve good stabilization of three-column fracture configuration of proximal tibia by using only one buttress plate and one supporting plate. 2 patients (10\%) required an additional supplementary buttress plate to adequately fix the posterolateral column. Similar technique was used by other authors like Wang et al\textsuperscript{23} with comparable functional results. Intraarticular congruency and fracture union so achieved in all our patients with minimal complications suggests the significance and superiority of this treatment modality over other methods.

**Conclusion**

The new “three-column concept” of tibial plateau fracture fixation has revolutionized this otherwise very challenging situation to manage. This new treatment modality based on three-column concept has made it possible to identify precisely the integrity of posterior articular surface or posterior column, the absence of which leads to an incomplete treatment plan as is true with other traditional surgical modalities. This new concept has made it possible to restore alignment and intraarticular congruency in comminuted tibial plateau fracture. This technique thus has grossly reduced high incidence of early osteoarthritis, pain and disability in long run which was rampantly present in other surgical techniques.

**Source of Funding-** Self

**Ethical Clearance-** Not required

**Conflict of Interest-** Nil

**References**


Assessment of the Oral Health Status and Erosive Tooth Wear among Employees of a Petrochemical Industry in Mangalore, India

Vaibhav Pravin Thakkar¹, Ashwini Rao², Rajesh G³, Ramya Shenoy³, Mithun Pai B.H³

¹Ex-PG Student, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India, ²Professor, ³Associate Professor, Department of Public Health Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India

Abstract

Objective: To assess occupational exposure to acids and its possible impact on oral health of individuals.

Method: A cross sectional descriptive survey was conducted on 597 employees. A calibrated questionnaire was administered, oral health status of the employees was assessed using WHO Oral Health Assessment Proforma and Erosive Tooth Wear was measured using Basic Erosive Wear Examination (BEWE).

Results: 49.9% employees presented with some form of erosive tooth wear. Employees who had more frequent exposure to acid fumes at work showed more dental erosion (Chi-square test, p < 0.05). Also it was observed that the prevalence of dental erosion increased with increase in work experience of the employee (r = 0.392, p < 0.01).

Conclusions: There was a high prevalence of erosive tooth wear among the petrochemical workers and necessary safety precautions and preventive interventions are recommended.

Keywords: dental erosion; occupational health; oral health; basic erosive wear examination

Introduction

Oral health is the standard of health of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well-being.¹ During a lifetime, teeth are exposed to a number of physical and chemical insults resulting in wear and tear of dental tissues owing to abrasion, attrition, abfraction and erosion. All of these factors result in tooth wear either from the simultaneous and/or synergistic action of these processes.² Erosion is chemical wear as a result of extrinsic or intrinsic acids or chelators acting on plaque-free tooth surfaces. The result of continuing acid exposure, however, is not only a clinically visible defect, but also a change in the physical properties of remaining tooth surface.³

Every workplace is really a work environment where there are interactions between people and the chemical and physical demands involved with performing the job.⁴ In many occupations these interactions are the foundation of health problems among workers. Hence maintenance of ‘healthy’ work environment is given importance in society. Industrial hygiene and the term ‘occupational health’ encompasses all principles related to the same.⁵ One of them is to provide a safe ‘occupational environment’ in order to safeguard the health of workers and to step up industrial production. Oral cavity is vulnerable to external agents and some occupational exposures are associated with oral changes in both hard and soft tissues.⁶⁷ Occupational dental erosion is one such dental health problem encountered in
various industries and is caused by exposure to various types of acidic contaminants in workplace.\textsuperscript{4,8,9,10,11} 

Assessment of effect of environmental exposure to acids has received much attention in recent years and has been the subject of numerous articles published in scientific literature in the recent past.\textsuperscript{4,6,7,9,12} Occupational exposure to acids and its consequences on general and oral health has been identified as “a challenge for the 21st century.” \textsuperscript{13} However, there is a definite paucity of literature on the oral health status of workers in petrochemical industry in this part of the country. Therefore, present study was conceptualized to assess oral health status and erosive tooth wear among employees of a petrochemical industry in Mangalore.

**Material and Method**

Cross-sectional descriptive study was conducted among employees of a petrochemical industry in Mangalore. Basic information was obtained using a questionnaire. Oral health status was assessed using WHO Oral Health Assessment proforma\textsuperscript{14} and erosive tooth wear using Basic Erosive Wear Examination\textsuperscript{15} (BEWE) scoring system. Employees were classified as Type-A; who worked in the core area of refinery (continuous exposure) and Type-B who were not exposed continuously to acid mists (intermittent exposure) which included the ones in administrative block and house-keeping staff. A total of 1,500 employees at the petrochemical industry formed sampling frame and simple random sampling technique was employed to select the study subjects.

Based on the pilot study, prevalence of tooth wear in employees was found to be 40%, considering 10% permissible error at 95% confidence interval, total sample size was estimated to be 600.

Male or female participants aged between 18 and 59 years who gave written informed consent form were included in the present study. Only the employees with work experience equal to or more than a year were included.

Subjects with medical conditions such as Gastro Esophageal Reflux Disease (GERD), Anorexia Nervosa, Bulimia, Bronchial Asthma, Diabetes Mellitus, hypertension, Coronary Heart Disease, Sjogren’s syndrome, subjects undergone head and neck irradiation, immuno-compromised individuals and pregnant subjects were not included. Bruxers with a score of 6 or more were excluded.\textsuperscript{16}

Data collection was started after obtaining approval from Institutional Ethics Committee.

Prior to conducting survey, calibration was done to establish intra-examiner reliability.\textsuperscript{17} Kappa value obtained was 0.951 indicating almost total agreement.\textsuperscript{18} Assessment of inter-examiner reliability for recording levels of dental erosion using BEWE Index showed there was almost total agreement (Kappa value = 0.896). Reliability of questionnaire was measured and Cronbach’s alpha value\textsuperscript{19} of 0.85 was obtained indicating good reliability. All the subjects were provided with a patient information sheet and a written informed consent was obtained from them before examination. The data was coded and analyzed using the SPSS version 11.5. The level of statistical significance was kept at $p < 0.05$. Chi square test and binary logistic regression were used for analysis of collected data.

**Results**

600 workers were examined in this cross sectional survey. All employees used protective footwear and helmets but none of them used face masks. Mean age of the study population was $30 \pm 8.6$ years. Standard method was used to investigate bruxism\textsuperscript{16} and only 3 subjects classified as bruxers were excluded from the study making the total study population 597.

60.1% of the employees consumed carbonated soft drinks and 4 employees preferred having bottled soda on occasional basis. 39.2% of the employees preferred non-carbonated drinks for consumption. 24% of the employees were smokers, 42.5% were tobacco chewers and 31% consumed alcohol.

Mean DMFT was $2.86 \pm 3.07$ and number of employees with decayed, missing and filled teeth being 67.3%, 26.5% and 12.7% respectively. Mean number of teeth with decayed, filled and missing component observed in this population were $1.9 \pm 2.14$, $0.6 \pm 1.3$ and $0.3 \pm 1.0$ respectively. Dental caries prevalence in this population was 67.3%. 54 employees (9%) showed presence of anterior tooth trauma and most of them recalled of accidents at the industrial site as the cause of trauma. Periodontal status of employees was recorded using the Community Periodontal Index (CPI). The analysis showed that 66.3% of the employees had
Calculus as the highest score for CPI whereas 87.4% of the employees did not have any loss of periodontal attachment.

Prevalence of erosive tooth wear was higher in Type-B employees (261/484) as compared with those in Type-A (37/113) and it was statistically significant (Chi-square test, p < 0.05). Odds ratio reported was 2.4 (95%CI: 1.5-3.7) There was significant increase in disease rate with increase in work experience. Using bivariate analysis it was found that correlation was statistically significant at p = 0.01 level between these two variables. (r = 0.392)

Depending on the number of years of work experience in the industry, study population was divided as; Group I (n=334) having work experience from 1-4 years and Group II (n=263) with a work experience of more than 4 years. Using Chi square test it was observed that prevalence of dental erosion appeared to be more in group II and it was statistically significant (p < 0.001). The odds ratio reported was 5.4 (95% CI: 3.8 - 7.7)

Table 1. Prevalence of dental erosion in the study population

<table>
<thead>
<tr>
<th></th>
<th>Group I (n = 334)</th>
<th>Group II (n = 263)</th>
<th>Total (n = 597)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prevalence of Dental Erosion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior</td>
<td>98 (16.4%)</td>
<td>165 (27.6%)</td>
<td>263 (44%)</td>
</tr>
<tr>
<td>Posterior</td>
<td>37 (6.1%)</td>
<td>97 (16.2%)</td>
<td>134 (22.4%)</td>
</tr>
<tr>
<td><strong>Prevalence of Dental Erosion in maxillary arch</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior</td>
<td>75 (12.5%)</td>
<td>148 (24.7%)</td>
<td>223 (37.3%)</td>
</tr>
<tr>
<td>Posterior</td>
<td>36 (6.03%)</td>
<td>96 (16.1%)</td>
<td>132 (22.1%)</td>
</tr>
<tr>
<td><strong>Prevalence of Dental Erosion in mandibular arch</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posterior</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The total numbers of employees examined for this study were 600, three employees were classified as bruxers and excluded. Hence, the final study population consisted of 597 employees.

Only 3% of the population presented with a medical condition. This could be attributed to the healthy worker effect. 20,21
There was no statistically significant difference between employees with erosion and without erosion in the habit of consumption of carbonated beverages \( (p = 0.080) \). On the other hand there was a statistically significant difference between employees with and without erosion when fruit juice consumption and habit of alcohol consumption were considered \( (p<0.05) \). This can confound the results obtained in the present study as consumption of these beverages is associated with development of dental erosion.

Caries prevalence in this population was less than the previously reported values.\(^{33}\) The mean number of decayed teeth \( (1.9 \pm 2.14) \) observed in this population was less than that seen in earlier studies where it was 2.6 and 3.8 reported by Dale et al\(^{14}\) and Petersen et al\(^9\) respectively. The missing and filled component among the employees was less as compared to those observed in previous studies.\(^{33, 34}\)

Most severe condition in 66.3% of population in relation to periodontal health was deposition of calculus on tooth surface. This finding was similar to that reported by Wierzbicka et al.\(^{35}\) Prevalence of periodontal pocket was more in Group II employees and is in agreement with the previous reports.\(^{8, 33, 36, 37, 38}\) 12% of the employees reported to have some loss of attachment. No previous study could be found presenting the loss of attachment in the workers exposed to acid fumes at workplace.

Previous studies\(^{9, 37, 38, 39, 40}\), have reported that exposure to acid fumes was related to loss of tooth surface, leading to loss of teeth and eventually high number of employees were observed to use prosthesis for the same. In the present study, need for dental prosthesis was very less.

High prevalence of dental erosion (Table 1) in this study population is in line with other reported studies where prevalence ranged from 30-60%.\(^{8, 9, 12, 38, 39}\) However, these results are different from study done by Chikte et al\(^{10}\) where 90% of exposed population presented with dental erosion. This high rate of dental erosion was not reported even in the Group II employees. Prevalence of dental erosion was more in the Type-B employees which was consistent with that reported earlier.\(^{10, 12, 38, 39,}\)

At the surface level it was observed that the prevalence of erosive tooth wear was more on facial/buccal surface and second sextant i.e., maxillary anterior segment was the most severely affected one with dental erosion. (Fig.1)

On an average this population lies in the low risk category (mean cumulative BEWE Index score 2.13 \( \pm 2.99 \)) of the risk levels given by Bartlett et al.\(^{15}\) Recommendations for the low risk level are oral hygiene, dietary assessment and advice, routine maintenance and observation and repeat observations at 2-years interval. For employees with higher scores recommendations given by Bartlett et al\(^{15}\) should be followed for maintenance of proper oral hygiene and prevention of progression of lesions.

Further studies should be done with a well-designed case-control methodology with proper matching among cases and controls to determine the effect of exposure to petrochemicals at workplace on oral health. A prospective cohort study can also be recommended in this population. The amount of sulphuric acid present in the air at different sites in the industry has to be measured and safety precautions to be taken accordingly. Along with all the safety measures taken in the industry for prevention of accidents, the employees should be recommended to have proper oral hygiene practices, maintain the health of their oral cavity and lead a socially and economically productive life.

**Conflict of Interest:** None declared

**Sources of Funding:** None.

**Ethical Clearance:** Taken from Institutional Ethics Committee of Manipal College of Dental Sciences, Mangalore.

**References**

4. Kim HD, Kim JB. An epidemiologic study on


Contribution of Metagenomics Towards Identification of Oral Flora - A Review

Anitha Balaji¹, Krishnan Mahalakshmi², Jagadeesan Aarthi³, Mohan Valiathan¹, Radhakrishnan Mensudar⁴

¹Professor, Department of Periodontics, ²Professor, Department of Microbiology, ³Senior Lecturer, BIHER, Chennai

Abstract

Oral flora has always presented itself in a perplexing way in terms of its biodiversity and niche. Over the years numerous techniques have been used to identify and relate these microbes to oral and systemic diseases. Recently, metagenomics has gained predominance in this field due to its potential in detecting non-cultivable flora. In the previous decade several reports have been published on identification of floral pattern, new flora and relation of such patterns to pathological processes and risk marking. But a consolidated review, linking these to actual pathology is still not published. This review provides an insight into current status of such associations.

Keywords: Metagenomics, oral microbiome, identification,

Introduction

Oral cavity acts an ecological niche to innumerable number of microbes that exist in a symbiotic relationship. Although their presence is not always alarming, understanding their role and identity has enriched our knowledge on prevention, intervention and control of oral diseases. It has also been known for long that certain set of bacteria are prevalent in certain disease conditions, opening the vista to unlock the relation between floral identity, count or pattern with specific diseases. With an extensive microbial flora present in the oral cavity, not all organisms are cultivable and this leads to the need for genetic methods in order to identify them.

In this view, microbial gene sequencing tools have evolved from a large extent from laborious time consuming methodologies to recent real-time detection techniques come. Genome sequencing especially the Next Generation Sequencing (NGS) method has revolutionized the landscape of microbiology and thus the detection of infectious diseases.¹

The past decade has seen a huge surge in research relating oral flora to oral and systemic diseases. Metagenomics is an equitable way of identifying and studying micro-organisms in their habitat, without culturing them. Oral cavity is known to provide two primary surfaces for microbial colonization - the Mucosa (soft tissue) and teeth (hard tissue).³ Thus, the oral microbiome plays an important role in both healthy and diseased conditions. Of the identified flora, most of them are uncultivable bacteria.⁴⁵

Current evidence suggests the need for biofilm formation for the occurrence of oral infection diseases.⁶ Thus, the microbial composition in different clinical scenarios remains hitherto unexplored. The role of traditional microbiological methods is presently unsatisfactory since most of the bacteria are uncultivable. The newer technology to analyze the microbial population include bioinformatic analysis, DNA-based analysis (Meta-genome), RNA level (Meta-transcriptome), protein composition of the oral microbiome (Proteome), and functional activity microbial population (Metabolome).⁷ Currently, metagenomic analysis plays a vital role in evaluating the complex oral microbiome.

The term ‘Metagenomics’ was first coined by Jon Clardy and Robert M. Goodman who first published their data in 1998. It has been defined as the genomic
analysis of micro-organism by direct extraction and cloning of DNA from an assemblage micro-organism. In Greek, ‘Meta means transcendent’ (Combination of separate analyses). Genomics refers to the study of genome. It differs from the traditional genomic segment in many ways. Metagenomics requires greater attention to sampling and assessing the diversity of a sample and extracting the appropriate nucleic acid from the sample is highly challenging.

The first completed sequence of microbial genome was published in 1955. Numerous genome of oral pathogens have been sequenced and the details of these genomes have been reported by various authors. Earlier it had its reports mostly in ecological analysis (Environmental Genomics). Currently, a wider application into medical sciences as clinical metagenomics is being used for detecting and analysing non-cultivable pathogens.

Microbial metagenomics widely involves 2 possible and parallel strategies:

Targeted-strategy known as Deep Amplicon Sequencing (DAS)

Shotgun metagenomics, which is a much broader analysis.

The sequence-driven approach has limited existing knowledge. If the metagenomic gene does resemble the gene deposited in the database little is learned about the gene or its products from its sequence alone. In the function-driven approach most of the genes cannot be expressed easily by a surrogate host. Thus both these approaches are complimentary and should be pursued in parallel.

In dentistry, metagenomics can identify specific metabolic pathways and genes associated with oral diseases, produce large amounts of genomic information regarding oral microbiome, help to elucidate the potential role of oral bacteria in the initiation and establishment of dental biofilm, enable characterization of bacterial flora present in the endodontic system in order to establish their aetiology thus enabling appropriate treatment for specific diseases. In simpler words, metagenomic analysis helps to elucidate the role of specific pathogens in disease progression thus enabling us to identify the pathogenesis of microbial diseases.

Recently, numerous studies have been reported on applications of metagenomics in dentistry. Burczynska et al. 2017 has reported the application of metagenomics in dentistry with a focus on microbial diversity. It is also noted that metagenomic analyses have improved the speed of microbial identification as reported by Lazarevic et al. (2009) and Hasan et al. (2014). This review provides insight into available literature on metagenomics and oral microbial flora and its future perspective.

Microbial prospecting of biodiversity:

The presenting problem of biodiversity is its consequence on treatment plan. The intervention planned has to focus on the offending microbiota rather than non specific antimicrobial therapy. Metagenomics has contributed immensely to the identification of new species in oral flora which has in turn led to the exploration of unforeseen organisms in the oral cavity. This could be a possible breakthrough in our knowledge towards the etiopathogenesis of various oral diseases. Parahitiyawa et al. (2010) has reported more that 700 species as inhabitants of oral cavity.

Dridi et al. (2011) has reported Archaea spp in oral cavity, which is well beyond its natural habitat of extreme environments. Recently, many new serotypes, phylotypes of known species and new species have been identified. Parahitiyawa has reported that 42% of clones isolated from 2 root canals were yet to be phylotyped. Heller et al. (2016) has studied the biodiversity of dental plaque during its formative stages.

Wylie et al. has established the presence of double stranded DNA viruses in healthy adults such as herpesviruses, papillomaviruses, polyomaviruses, adenoviruses, anelloviruses, parvoviruses, and circoviruses. Interestingly, Moon and Lee (2016) have shown interest in the field of personalized microbiome using bioinformatics approach. With metagenomics, we see surprising microbes in unexpected places, staying symbiotically in the niche, without showing apparent pathogenesis. In such a scenario, it is necessary to establish this personal microbial signature, before grading its presence as pathology.

Wang et al. (2016) has explored phage-bacteria interaction in human oral microbiome. They have shown the invasion of phages in non putative bacteria, showing the phage-bacteria interaction in oral cavity.
Ma et al. (2014) have reported the complexity of Human Pappilloma Viruses (HPV) in the healthy individuals, challenging the existing association of HPV in human diseases. They have also identified new types of HPV beyond the known 109 types.

Biogeographical investigations and clinical implications:

Numerous works reported regarding the microbiota or metagenomics of specific niche in the oral cavity has essentially paved way to split oral cavity in to several sub-niche areas for better understanding of pathogenesis. Human microbiome project has substantially helped to identify such species in addition to bioinformatics.

Gingival biogeographic studies have been conducted by various investigators. Comparing subgingival plaques from postmenopausal women, it was observed that out of the 464 species identified, 22.8% had elevated abundance in disease, while only 6.3% had elevated abundance in health according to LaMonte et al. (2018). In cases of chronic periodontitis, subgingival flora has shown a notable contrast. Streptococcus was dominant in all healthy samples, while Prevotella, Porphyromonas, and Treponema dominated in all samples obtained from diseased individuals.

In cases of peri-implantitis, Fusobacterium nucleatum and Prevotella denticola were more prevalent in samples inhabiting the biogeo graphic picture on implant surfaces. But Cortês-Acha et al. (2017) suggested that flora colonizing the exposed dental implants form a distinct microbiome, independent of the patient’s periodontal profile.

Similarly, tongue coating in children with halitosis has been metagenomically analyzed and found to contain different flora. Prevalence of Leptotrichia wadei, Peptostreptococcus stomatis and Prevotella shahii were higher in subjects with halitosis.

Biodiversity and its relevance to oral/systemic diseases

Human oral microbiota is related to oral and systemic diseases in an intricate way. Though the microbial identification is an age old process, new methods have regrouped the previously grouped species, according to functional and molecular basis. This offers better edge when predicting and prognosing the underlying disease conditions.

Certain studies have also seen the variation in flora with respect to different systemic parameters. Human salivary microbiome is known to show circadian variations according to Takayasu et al. While inter individual variations were high, intra individual variations were low. Streptococcus, Gemella and Prevotella showed high association with the circadian oscillation. In vitro incubation abolished the oscillation, strongly associating the host mediated factors in the changes. In addition to oral disease diagnosis and prognosis, Anukam and Agbakoba (2017) have reported the change in oral microbiome with respect to reproductive age and cycle in women.

A recent study has related microbiota to postoperative inflammation in cleft lip and palate patients. Pre-operative samples have showed inflammation-related flora like Tannerella, sp., Porphyromonas sp., Gemella sp., Moraxella sp., Prevotella nigrescens, and Prevotella intermedia. This model of Liu et al. (2016) showed sensitivity and specificity of 76.9% and 86.7% respectively. They suggest that the oral microbiota profile before alveolar bone grafting may be a good technique to include in the arsenal of investigations to predict the risk of post-operative inflammation at grafted sites.

In a recent research, loss of diversity in oral flora has been consistently noted in periodontitis, attributing predictive value to metagenomic sequencing techniques. Typically they have noted a statistically significant correlation between P. gingivalis population and other marker microbes, as the periodontitis progressed. In a review Zarco et al. (2011) indicated a shift in the microbiome during disease progression. Chen et al. (2017) has noted that bacterial community assembly is robust against disturbances such as periodontitis. Patients with periodontitis are said to exhibit higher biodiversity of flora. This is in contrast with Ai et al. (2017), who reported a decrease in biodiversity.

Hence, at this juncture, potential predictive value of metagenomics has to be ascertained. Liu et al., has reported the disease microbiome to be highly enriched in virulence factors and specifically adapted to a parasitic lifestyle that takes advantage of the disrupted host homeostasis. Wang et al. (2013) has shown that there is an upregulation of functional genes and their consequent metabolic pathways like bacterial chemotaxis in
the microbiomes of periodontal disease. This fact was further confirmed by Shiba et al. (2016) in their metatranscriptome analysis of mRNA and rRNA. Shi et al. (2015) has achieved 81% accuracy in finding the clinical states of subgingival plaque from microbiome studies, where they characterized the subgingival microbiome of individual tooth sites before and after treatment using a large-scale metagenomic analysis. Chen et al. (2017) has analysed oral microbial diversity in health and disease and proposed that the analytical data can provide clues for preventing or curing certain oral conditions by adjusting the disturbed microbial compositions in oral disease to healthy level. Oral microbiota has been reported to undergo significant change in the quality and quantity of bacterioides and proteobacteria, in chronic hepatitis B cases, giving characteristic changes in tongue colour. Oral microbiota has also shown significant changes due to acculturation-related variables, such as nativity, age at immigration, time of stay in a country etc.

Though the oral microbiota may not be a causative agent for infectious diseases, their pattern has shown to enhance our capacity to identify the underlying disease process. Metagenomics has been seen an emerging biomarker for cancer prediction, especially, where Mycoplasma salivarium was proposed as a biomarker for oral carcinoma. Also, salivary microbiome is seen as a great tool of screening and diagnosis. Changes in oral metagenomic pattern was seen in long time sailors, where the diversity is reduced five fold in 120 days and oral flora showed pathological changes.

As understandable, Dysbiosis of buccal mucosa is evident in Oral Lichen Planus (OLP). According to He et al. (2015) four abundant bacteria exhibited significantly different prevalence at the genus level as follows - Streptococcus was more abundant in healthy control group, while Fusobacterium, Leptotrichia and Lautropia showed higher abundance in OLP group. They also noted differences between erosive and non-erosive OLP.

**Conclusion**

Current changes in lifestyle trends states that the human is a “super organism” with more than $10^{12}$ individual micro-organisms coexisting within the human body, which together makes up the human microbiome. WHO reports that around 60 to 90% of oral disease mainly includes periodontal disease and dental caries. Metagenomics is in its early stage of its development but in future, it will revolutionize the clinical diagnosis. It will enable to identify new enzymes and antibiotics. Only few studies have been conducted in dental patients. Thus in future, metagenomic techniques will help us to know the role of various oral microbiota composition, its function and also its relation to pathogenesis of oral infectious diseases. Future research utilizing sequence-based and functional metagenomics will provide an insight in understanding the diversity of the oral microbiome, which will eventually make an impact on clinical decision making to manage the pathogenic bacteria.

**Conflict of Interest:** Nil

**Funding Source:** Self

**Ethical Clearence:** Not Applicable

**References**


Abhinav Jain¹, Bhupinder Kaur Anand², MPS Marwaha³, Salil Kumar Srivastava⁴, Archana Chaudhary⁵, Sapna Jaiswal⁶
¹PG Student, ²Professor, Department of Community Medicine, SGT Medical College, Gurugram, ³Classified Specialist Aviation Medicine, Air Force Central Medical Establishment, New Delhi, ⁴Professor & HOD, Department of Pharmacology, Government Medical College, Badaun, U.P., ⁵Associate Professor, Department of Environmental Science, SGT University, Gurugram, ⁶Tutor, Department of Biochemistry, Ram Manohar Lohia, Lucknow

Abstract

Introduction:- Diabetes is a chronic disease marked by higher level of blood glucose from defects in insulin production, insulin action or both. According to a recent World Health Organization (WHO) report, India, with 32 million diabetic individuals in 2000, currently has the highest incidence of diabetes worldwide; these numbers are predicted to increase to 80 million by the year 2030 and this has given the country the distinction of being the “Diabetic capital” of the world.

Methodology:- The study was carried out in the Department of Community Medicine, Faculty of Medical & Health Sciences, SGT University. A through general examination, weight, height and BP measurement and blood glucose estimation was done. The filling of schedule was done in each household as per the following study tool. So, finally 420 subjects were included in this study.

Result:- The study “A study of prevalence of Diabetes mellitus and its risk factors in the Urban slum population of Gurugram was a community based cross-sectional study in urban slums of Gurgaon. Total 420 adults were selected for this study and were assessed for the prevalence of diabetes mellitus and associated risk factors by using a pre-designed, pre-tested, semi-structured schedule.

Conclusion:- There is an urgent need to implement prevention strategies for diabetes mellitus that are geared towards adoption of healthy lifestyle measures that prevent or delay the onset of type 2 diabetes mellitus.

Keywords:- Diabetes mellitus, blood glucose
hypertension and cardiovascular disorders have become the most serious health concerns in both developed and developing countries. It has been estimated that the largest increase in the number of people with diabetes will occur in the regions comprising the developing countries.

The number of people with diabetes was approximately 366 million in 2011, and by the year 2030 this number has been predicted to increase to 552 million. It is also estimated that approximately 80% of people with diabetes live in the low- and middle-income countries, which are designated as the developing economies in the world. China and India will bear the major burden of diabetes, with an estimated 129.7 and 101.2 million cases, respectively, by 2030. The largest age group currently affected by diabetes is the 40–59 years age group, and by 2030 this is expected to move to the 60–79 years age group.

According to the World Health Report 2005, NCDs already contribute to 52% of the total mortality in India and this is expected to increase to 69% by the year 2030. Therefore, countries such as India are currently facing an epidemiologic transition with a ‘double burden’ of disease. There is a bit of controversy regarding the prevalence of diabetes in India, since most of the available data are derived from a few scattered studies conducted in different parts of the country. Few multicentric studies are available, those published include: the Indian Council of Medical Research (ICMR) study conducted during the 1970s, which reported a prevalence of 12–19% in urban areas and 4–10% in the rural areas of India; the National Urban Diabetes Survey (NUDS), which reported a prevalence of more than 12% among urban Indians; the Prevalence of Diabetes in India Study (PUDIS) that reported a prevalence of 5.9 and 2.7% among urban and rural subjects, respectively; and the WHO-ICMR NCD Risk Factor Surveillance study, which reported greater than 11% prevalence of diabetes among urban Indians.

The Aim of the study entitled “A study of prevalence of Diabetes Mellitus and its risk factors in the Urban slum population of Gurugram” was conducted in urban slums of Gurugram.

Material and Method

Study Area: - The study was carried out in the Department of Community Medicine, Faculty of Medical & Health Sciences, SGT University.

Data collection: - Each selected household was approached and health worker, local community leaders were informed prior to the visit. After obtaining informed consent from the participant, a face to face interview was conducted and information regarding socio demographic profile, personal and family history, marital status and income, utilization of health services, morbidities, physical activity and awareness regarding symptoms of diabetes was obtained.

A through general examination, weight, height and BP measurement and blood glucose estimation was done. The filling of schedule was done in each household as per the following study tool. So, finally 420 subjects were included in this study.

Inclusion criteria:

All the residents (of either sex) of the selected slums aged 20-79 years, who give consent will be included in the study.

Exclusion criteria:

Patients who are not willing to give consent for the study.

Type 1 diabetics and terminally ill patients will be excluded.

Pregnant women will be excluded.

Data Analysis:- All data was collected, coded, tabulated and analysed using Statistical Package for Social Science (SPSS) version 21 for statistical analysis and necessary statistical tests like proportions and chi square tests were applied. A significant p value was considered when p was less than 0.05 and it was considered highly significant when p value was less than or equal 0.01.

Finding

The study “A study of prevalence of Diabetes mellitus and its risk factors in the Urban slum population of Gurugram” was a community based cross-sectional study in urban slums of Gurgaon. Total 420 adults were selected for this study and were assessed for the prevalence of diabetes mellitus and associated risk factors by using a pre-designed, pre-tested, semi-structured schedule.
Table 1: Distribution of study subjects according to their age, N =420

<table>
<thead>
<tr>
<th>Age Group (Years)</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-39</td>
<td>140</td>
<td>33.4</td>
</tr>
<tr>
<td>40-59</td>
<td>246</td>
<td>58.5</td>
</tr>
<tr>
<td>60-79</td>
<td>34</td>
<td>8.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>420</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1 shows the age distribution of study participants. Majority 58.5% of the study participants belonged to 40-59 years age group, followed by 33.4% in 20-39 years age and rest 8.1% between 60-79 years age group. Similarly 70% of males and 52.8% females were in the age group of 40-59 years. The mean age of study participants was 43.79 ± 12.84 years.

Table 2. Socio demographic profile of study participants, N =420

<table>
<thead>
<tr>
<th>Variables</th>
<th>Male (n=140)</th>
<th>Female (n=280)</th>
<th>Total (N=420)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE GROUP (YEARS)</td>
<td>Number</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>20-39</td>
<td>31 (22.1)</td>
<td>109 (77.8)</td>
<td>140 (33.4)</td>
</tr>
<tr>
<td>40-59</td>
<td>98 (39.8)</td>
<td>148 (60.1)</td>
<td>246 (58.5)</td>
</tr>
<tr>
<td>60-79</td>
<td>11 (32.3)</td>
<td>23 (67.7)</td>
<td>34 (8.1)</td>
</tr>
</tbody>
</table>

Table 2 shows the sociodemographic profile of study participants. Majority 58.5% of study participants were in the age group of 40-59 years. About 80% of study participants were married and rest 20% were either unmarried/divorced or separated. About 76.5% participants were illiterate and 58.8% were employed. Majority 49.5% belonged to lower middle SES and only 1.9% belonged to upper socioeconomic status.

Table 3. Prevalence of Diabetes mellitus among study participants

<table>
<thead>
<tr>
<th>Diabetes mellitus</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>47 (33.5)</td>
<td>38 (13.5)</td>
<td>85 (20.2)</td>
</tr>
<tr>
<td>Absent</td>
<td>93 (66.5)</td>
<td>242 (86.5)</td>
<td>335 (79.8)</td>
</tr>
</tbody>
</table>

Table 3 shows the prevalence of diabetes mellitus among the study participants. Diabetes mellitus was defined as a person having a random plasma glucose ≥200 mg/dl and/or fasting plasma glucose ≥ 126 mg/dl after ≥ 8 hrs of overnight fasting. Individuals were subjected to a random blood sugar (RBS) screening by glucometer (Optium exceed by Abbott Healthcare).

The prevalence of diabetes mellitus was found to be 20.2% in the present study. The prevalence of diabetes mellitus among males was 33.5% which was higher as compared to prevalence among females i.e. 13.5%. Among those who were diagnosed with diabetes mellitus in the present study, about 44.7% were previously diagnosed and were on treatment. The mean blood glucose study participants was 160.10 ± 31.31 years. The mean blood glucose level of those diagnosed with diabetes mellitus was found to be 238.28 ± 29.29 years.

Table 4. Distribution of study participants according to type of diet

<table>
<thead>
<tr>
<th>Diet</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetarian</td>
<td>82 (58.5%)</td>
<td>107 (38.2%)</td>
<td>189 (45%)</td>
</tr>
<tr>
<td>Non-vegetarian</td>
<td>58 (41.5%)</td>
<td>173 (61.7%)</td>
<td>231 (55%)</td>
</tr>
</tbody>
</table>

Table 4 shows the distribution of study participants according to the type of diet. About 45% study participants were vegetarians and rest 55% consumed non-vegetarian food. Among the males, majority were vegetarians i.e. 58.5% and among females majority were non-vegetarians i.e. 61.7%
Discussion

The present cross sectional study on prevalence of diabetes mellitus and its risk factors was conducted among adults residing in the urban slum areas of Gurugram. The study aimed at determining the prevalence of diabetes and its associated risk factors. Diabetes was defined as a previously diagnosed or any person having random plasma glucose ≥200 mg/dl and/or fasting plasma glucose ≥ 126 mg/dl after ≥ 8 hrs of overnight fasting. A total of 420 study participants were recruited for the study, out of which 140 were males and rest 280 were females.

The prevalence of diabetes in the present study was found to be 20.2% which is considerably high . In a study by Jahagirdar SS et al\(^{10}\), the prevalence of diabetes is found to be 22% .In another study done by Madaan H et al. on prevalence of Diabetes in rural Sonepat district of Haryana\(^{11}\), 18.43% were found to be having diabetes. Similarly the National Urban Diabetes Survey showed an age-standardised prevalence of 12.1% for diabetes and 14% for IGT in six large metropolitan cities \(^{12}\).A community-based study done in Ahmedabad by Nayak et al.\(^{13}\) reported that prevalence of Type 2 diabetes as 13.8%. Another study done by Korita et al.\(^{14}\), in Ahmedabad, also reported prevalence of diabetes 7.33% in urban area. The Prevalence of Diabetes in India Study (PODIS) reported lower diabetes prevalence of 5.9% and 2.7% in urban and rural areas respectively with an overall prevalence of 4.3% .Many studies in India have reported a greater diabetes prevalence in urban adults as compared with rural adults.\(^{15-16}\) Recent studies have reported urban diabetes prevalence rates of 8–20% and rural diabetes prevalence rates of 5–15%.\(^{15}\)The higher prevalence of diabetes in the present study could be due to the changes in lifestyle, urbanization, and food habits.

Conclusion

This study concludes that, it has been observed that adults residing in the urban areas are exposed to many risk factors for non-communicable diseases especially diabetes mellitus. Following suggestions are recommended for reducing or preventing the emergence of diabetes

There is an urgent need to implement prevention strategies for diabetes mellitus that are geared towards adoption of healthy lifestyle measures that prevent or delay the onset of type 2 diabetes mellitus .There is a need to device tools for use by health provider to identify those who are at high risk of developing DM in order to start preventive and health primitive activities and follow up.

Conflict of Interest:- No Conflicts Of Interest.

Source of Funding:-Self

Ethical Clearance:- Certificate from Head of the Institution where study has been carried out.

References


Relationship between Geriatric Oral Health Assessment Index (GOHAI) and Oral Health Status of the Institutionalized Elderly in Mangalore, India

Priyanka Ravi, Ashwini Rao, Gururaghavendran Rajesh, Ramya Shenoy, BH Mithun Pai

1Ex-Postgraduate Student, 2Professor, 3Professor and Head, 4Associate Professor, Public Health Dentistry, Manipal College of Dental Sciences, Manipal Academy of Higher Education, Mangalore, Karnataka, India

Abstract

Background: Oral health of the geriatric population plays a major role in their overall health and quality of life. There is lack of access to dental care among the institutionalized elderly and there is a need to know their felt oral health needs and oral health evaluation of this population.

Method: This was a cross-sectional, descriptive type of survey carried out among the institutionalized elderly in Mangalore. The study population comprised all the elderly aged 60 years and above residing in homes for the elderly. Oral health-related quality of life was assessed using a pretested, self-administered questionnaire, Geriatric Oral Health Assessment Index (GOHAI). Oral examination was conducted in the homes using WHO oral health assessment form. The data were coded, statistical analysis was done using the SPSS version 19.0 and level of significance was kept at p < 0.05.

Findings: A total of 175 individuals participated in this study. Prevalence of dental caries was 44.6% (20.32±10.19), root caries was 40%, 57% had periodontal disease and 96% were complete or partially edentulous respectively. There was a significant association between GOHAI scores and the method of cleaning (p<0.005) and the frequency of changing toothbrush (p<0.005).

Conclusion: This study demonstrates that there is a high burden of oral disease among the elderly. There is an urgent need for an organized geriatric dental care programs as their oral health is neglected.

Keywords: Geriatric Dentistry, Geriatric Assessment, Oral Health, Homes for the aged, Dental Health Survey.

Introduction

The World Health Organization (WHO) has defined health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”.

Clinical indicators of oral disease such as dental caries or periodontal disease are not entirely suitable to capture the concept of health declared by WHO, particularly the aspects of mental and social wellbeing. This resulted in a demand for health status measures, in addition to clinical measures of disease status, culminating in the development of Oral Health Related Quality of life (OHRQoL) measures that could evaluate the impact of oral conditions on the physical, psychological and social wellbeing of an individual.

OHRQoL is defined as “a multidimensional construct that reflects (among other things) people’s comfort when eating, sleeping, and engaging in social interaction; their self-esteem; and their satisfaction with
The Geriatric Oral Health Assessment Index (GOHAI) is one of the oral health self-perception tools used worldwide among the elderly, which was developed by Atchison and Dolan. It is associated with quality of life, and its results indicate the impact of clinical oral conditions on well-being. GOHAI is composed of 12 questions about three domains of OHRQoL: physical function (feeding, speech and swallowing), pain or discomfort and psychosocial function (appearance, social relationship).

In almost every country, the proportion of people aged over 60 years is growing faster than any other age group, as a result of both longer life expectancy and declining fertility rates. The proportion of the world’s population over 60 years is projected to double from about 11% in 2000 to 22% in 2050. The absolute number of people aged 60 years and over is expected to increase from 605 million to 2 billion over the same period.

As with other health issues, older people have very different oral health needs. They are more likely to take medication that causes dry mouth, leading to tooth decay and infections of the mouth. The results of oral health problems reverberate throughout the body affecting their quality of life. These considerations led to the conception of this study.

Material and Method

The study was a cross sectional, descriptive type of survey carried out among the institutionalized elderly in Mangalore. The study population comprised all the elderly aged 60 years and above residing in homes for the elderly in Mangalore. Inclusion criteria were those participants aged 60 years and above, residents of institutions for the elderly and those who are able to communicate either in English/Kannada. Those unwilling/unable to give written informed consent were excluded from the study. Data collection was carried out over a period of six months from February 2014- July 2014.

Calibration of the examiner was done by examining ten patients who were re-evaluated by two experts. The intra examiner reliability was assessed using Kappa Statistic (0.78). Face to face interview was conducted to obtain demographic data pertaining to age, sex, educational qualification and duration of stay in the home.

Geriatric Oral Health Assessment Index (GOHAI) was used to assess self-reported oral health problems of the institutionalized elderly. The GOHAI is a 12 item questionnaire which consists of 3 domains, the first domain ‘physical functions’ consists of 4 items, the second domain ‘psychosocial functions’ consists of 5 items and the third domain ‘pain or discomfort’ consists of 3 items. It was recorded by asking the participants if they had always, often, sometimes, seldom, or never experienced problems in the previous 3 months. The questionnaire was translated into Kannada by a professional, and then translated back to English by an independent translator. It was pre tested on 10 individuals. There was a good internal consistency of the questionnaire which was measured using Cronbach’s alpha (0.81). Oral health status was assessed using the WHO Oral Health Assessment Form (1997). The data was coded and analyzed using the SPSS version 19.0. The level of statistical significance was kept at $p < 0.05$.

Findings

The present study was conducted among the institutionalized elderly in Mangalore. A total of 175 participants from 5 institutions for elderly participated in this cross sectional survey. The mean age of the study population was 70.38 ± 10.98 years and 87 (49.7%) participants were between the age group of 60-69 years; 40% were male and 60% were female. One participant had a malignant tumor on the buccal mucosa and alveolar ridge, one participant had ulceration (aphthous) on the buccal mucosa, one participant had candidiasis on the dorsal surface of the tongue and four participants had abscess in the gingiva.

The prevalence of dental caries and root caries were 44.6% and 40%, whereas missing teeth and filled teeth were 96% and 2.3% respectively. The mean Decayed, Missing and Filled Teeth (DMFT) was 20.32 ± 10.19. A total of 11.4% participants required one surface filling while 7.4% participants had need for two or more surface fillings. Pulp care was indicated for 6.9% participants while 38.9% participants had teeth indicated for extraction. (Table 1)

Around 43 subjects had Code 2 as the highest score, which indicated that majority (33.6%) of the participants had calculus deposits. Bleeding on probing was the highest score among 7.1% of the participants whereas...
25% and 11.7% had a pocket of 4-5mm and 6mm or more respectively. Loss of attachment of 0-3mm was seen in 46.1%, 4-5mm was seen in 16.4%, 6-8mm was seen in 23.4%, 9-11mm was in 3.2%, 12mm or more was seen in 10.9% respectively. (Table 2)

There were 2 participants with partial denture, 20 were with full or complete denture. About 23% of the participants did not require any prosthesis, but 27% needed full prosthesis in the upper arch. About 87% of elders did not have prosthesis in the lower arch. There was one participant with partial denture and 21 were with full or complete denture. Need for prostheses were higher for maxillary arch as compared to mandibular arch.

A statistically significant difference was found between GOHAI scores and the method of cleaning [F(2)=5.50, p=0.005] and frequency of changing toothbrush [F(3)=6.55, p=0.00] as determined by one way ANOVA. The method of cleaning and frequency of changing tooth brush were significantly associated with GOHAI score (Table 3).

**Table 1: Distribution of Dental caries**

<table>
<thead>
<tr>
<th>Dental caries</th>
<th>Participants (n =175)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of dental caries</td>
<td>78(44.6)</td>
</tr>
<tr>
<td>Prevalence of missing teeth</td>
<td>168(96.0)</td>
</tr>
<tr>
<td>Prevalence of filled teeth</td>
<td>4(2.3)</td>
</tr>
<tr>
<td>Root caries prevalence</td>
<td>70(40)</td>
</tr>
<tr>
<td>Mean Decay Teeth (DT)</td>
<td>2.19±3.55</td>
</tr>
<tr>
<td>Mean Missing Teeth (MT)</td>
<td>18.35±11.460</td>
</tr>
<tr>
<td>Mean Filled Teeth (FT)</td>
<td>0.06±0.55</td>
</tr>
<tr>
<td>Mean Decayed Missing and Filled Teeth (DMFT)</td>
<td>20.32±10.19</td>
</tr>
</tbody>
</table>

*Numbers in parenthesis represents percentage

**Table 2: Periodontal Status of the study participants**

<table>
<thead>
<tr>
<th>Community Periodontal Index (CPI scores)</th>
<th>Participants (n =128)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects with Code 0 as highest score</td>
<td>29(22.6)</td>
</tr>
<tr>
<td>Subjects with Code 1 as highest score</td>
<td>9(7.1)</td>
</tr>
<tr>
<td>Subjects with Code 2 as highest score</td>
<td>43(33.6)</td>
</tr>
<tr>
<td>Subjects with Code 3 as highest score</td>
<td>32(25)</td>
</tr>
<tr>
<td>Subjects with Code 4 as highest score</td>
<td>15(11.7)</td>
</tr>
<tr>
<td>Mean no. of sextants with Code 0</td>
<td>0.29±0.72</td>
</tr>
<tr>
<td>Mean no. of sextants with Code 1</td>
<td>0.34±0.82</td>
</tr>
<tr>
<td>Mean no. of sextants with Code 2</td>
<td>1.04±1.52</td>
</tr>
<tr>
<td>Mean no. of sextants with Code 3</td>
<td>0.38±0.80</td>
</tr>
<tr>
<td>Mean no. of sextants with Code 4</td>
<td>0.11±0.41</td>
</tr>
</tbody>
</table>

*Numbers in parenthesis represents percentage
Table 3: GOHAI scores and its relation to personal habits and dietary characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participants n (%)</th>
<th>GOHAI score*</th>
<th>Test score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean ±SD**</td>
<td>Median</td>
</tr>
<tr>
<td><strong>Method of cleaning</strong></td>
<td></td>
<td>F(2)=5.50</td>
<td>p=0.005*</td>
</tr>
<tr>
<td>Toothbrush</td>
<td>111(63.4)</td>
<td>26.93±5.93</td>
<td>26.00</td>
</tr>
<tr>
<td>Finger</td>
<td>62(35.4)</td>
<td>29.90±6.79</td>
<td>30.00</td>
</tr>
<tr>
<td>Others</td>
<td>2(1.1)</td>
<td>34.50±9.19</td>
<td>34.50</td>
</tr>
<tr>
<td><strong>Frequency of changing toothbrush</strong></td>
<td></td>
<td>F(3)=6.55</td>
<td>p=0.00*</td>
</tr>
<tr>
<td>&lt; 3 months</td>
<td>30(17.1)</td>
<td>26.40±5.34</td>
<td>26.00</td>
</tr>
<tr>
<td>3 – 6 months</td>
<td>21(12.0)</td>
<td>31.09±5.95</td>
<td>32.00</td>
</tr>
<tr>
<td>&gt; 6 months</td>
<td>54(30.9)</td>
<td>25.75±5.60</td>
<td>24.50</td>
</tr>
</tbody>
</table>

* Significance, p <0.05

**Numbers in parenthesis represents percentage

+GOHAI: Geriatric Oral Health Assessment Index.

++ SD: Standard Deviation

**Discussion**

The present study was an attempt to determine the relationship between Geriatric Oral Health Assessment Index (GOHAI) and oral health status of the institutionalized elderly in Mangalore. The study findings demonstrate that the GOHAI scores ranged from 12 to 60, with a mean score of 44.57 with a higher score indicating poor oral health related quality of life. Similar mean scores were also reported by McMillan et al. (51.9) and Gil-Montoya et al. (52.1). Contrasting mean GOHAI scores were reported by Jones et al. (23.9). Locker et al. in their study in Canada reported that 8.4% had a GOHAI score of zero.

Majority of the participants (96%) did not have any abnormal condition which was in contrast to the findings of several other studies which have reported xerostomia, TMJ pain, oral mucosal changes as common findings among institutionalised elderly. Miyazaki et al. in their study among institutionalized elderly in Japan reported that 81% had no unusual symptoms in their TMJ while clicking sound was the most frequent symptom (17%), which is strikingly in contrast with the present study as there were no TMJ problems in this study. Galan et al. in a study among community-dwelling older Canadians reported higher soft tissue anomalies (67%), alveolar bone (41%) and alveolar mucosal (40%) anomalies along with hyperplastic ridges and denture stomatitis in accordance with the present study. In contrast, Da Silva et al. reported that more than half presented an abnormality of the oral mucosa in his study conducted among elderly in Campinas, Southeastern Brazil.

The mean DMFT among elders has been reported in literature by Galan et al. (25.1±5.1), Gil-Montoya et al. (20.2±10.5), Esmeriz et al. (28.5±4.8) respectively, which was in accordance with our mean DMFT (20.32±10.19) values. There was a high prevalence of root caries in the present study (40%), which was also seen in other studies by Locker et al. and Unlüer et al. whereas, Galan et al. (22%), Jones et al. (10%), Simunković et al. (0.17) have reported a lower prevalence of root caries compared to the present study.

Around 11.4% participants required one surface filling while 7.4% participants had need for two or more surface fillings, similar restorative need were reported by Angelillo et al. and Unlüer et al. Few subjects required pulp care (6.9%), while 38.9% participants had teeth indicated for extraction. Galan et al. have reported restorative treatment need for 79% and prosthetics care for 77% of subjects in their study.
Code 2 was the highest score indicating that majority (24.6%) of the participants had calculus deposits with pocket formation. In contrast Galan et al.\textsuperscript{13} in a study among community-dwelling older Canadians reported that 80% had at least one tooth with shallow pockets (code 3) or deep pockets (code 4). Petelin et al.\textsuperscript{21} used CPITN index and appraised most of the participants (81.9%) needed oral hygiene education, more than half (56.7%) needed scaling and root planning and only 21.6% needed periodontal surgical treatment among the elderly living in residential homes in Slovenia. Prosthetic treatment need was more for maxillary arch as compared to mandibular arch.

Interestingly, current study found an association between GOHAI scores and the method of cleaning and frequency of changing toothbrush which may be attributed to the fact that those respondents are more concerned with their oral health. There was negative correlation between decayed teeth, filled teeth, dental caries experience (DMFT) and GOHAI scores, it was not statistically significant. Positive correlation was found to be present between GOHAI and missing teeth, which also did not show any statistical significance.

An inherent limitation of the present study is the cross-sectional design which does not give any insights into the causality. Longitudinal studies on a varied sample can give information about the causal relationship of different factors influencing normative need and self-perceived need.

**Conclusion**

This study demonstrated that GOHAI scores were associated with materials used for cleaning and frequency of changing toothbrush among institutionalized elderly. There is an urgent need for an organised dental care programs for the geriatric patients as they have a very high prevalence of dental caries. The institutionalised elderly are in need of easily accessible and well organised dental care set up. The poor oral health of the participants in this study is can be related to infrequent dental visits as well as insufficient or incorrect oral hygiene practices.

**Conflict of Interest** – None

**Source of Funding** – Self Funded

**Ethical Clearance** – Ethical approval was obtained from the Institutional Ethics Committee of Manipal College of Dental Sciences, Mangalore (Ref No: MCODS/198/2013; Protocol Ref No: 13129).

**References**


Comparative Study of CMC 0.5% Eye Drops versus Combination of .05% Cyclosporin Ophthalmic Emulsion and 0.5% CMC Eye Drops in Dry Eye Disorders

Prerana Agarwal¹, D.J. Pandey²
¹Assistant Professor, ²Professor, Department of Ophthalmology, Saraswathi Institute of Medical Sciences, Hapur, U.P (India)

Abstract

Background: Dry eye disease is a common disorder provoking changes in tear film and ocular surface. Untreated dry eye could cause ocular infections, corneal ulcer and blindness. Only a few drugs are authorized so far for the treatment of dry eye disease and the possibilities of evolution in this sector are immense. Objectives: Compare efficacy of carboxy methyl cellulose .5% eye drops with combination of 0.5% carboxy methyl cellulose eye drops and .05% cyclosporin ophthalmic emulsion for treatment of dry eyes. Material and Method: 40 patient presenting with dry were selected randomly. They were divided into 2 groups. Group I received CMC.5% eye drops four times a day and group II received .05% Cyclosporin ophthalmic emulsion two times daily and .5% CMC eye drops 4times a day. All patients were evaluated on day 0, 2 weeks, 1 month, 3 month and 6 month for relief in ocular symptoms and diagnostic dry eye tests. Results: The mean age in group I was 39.72 ± 6.85 years and in group II was 40.2 ± 5.28 years. Ocular discomfort, dryness and tearing were seen in all the cases. Comparison of different parameters after six months of treatment between group I and II showed that the comparison of net score in two groups is statistically significant (p < 0.05). Conclusions: There was statistically significant difference between the outcome of two groups. Group 2 patients who used combination of cyclosporin0.05% ophthalmic emulsion two times daily along with CMC 0.5% eye drops 4times a day were better relieved as compared to patients in group 1 who used 0.5% CMC eye drops four times daily for treatment of dry eyes

Keywords: Carboxymethylcellulose, Cyclosporine, Dry eye

Introduction

“Dry eye is a multifactorial disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and inflammation of the ocular surface.”¹ Dry eye is one of the most common causes of ocular morbidity in patients presenting to an ophthalmology outpatient department. Approximately one out of seven individuals aged 65–84 years report symptoms of dry eye often or all of the time.² Management of dry eye depends on the cause and severity of the condition. Various strategies have been described for medical management of dry eye; these include, the topical use of lubricants (artificial tear substitutes), topical corticosteroids and anti-inflammatory therapies, cyclosporine ophthalmic emulsion, and the systemic use of antioxidants (e.g., omega-3 fatty acids).¹²

Artificial tears are aqueous solutions containing polymers that determine their viscosity, retention time, and adhesion to the ocular surface. Various polymers currently in use include cellulose derivatives (e.g., hydroxypropyl methylcellulose [HPMC], “carboxymethylcellulose [CMC]), polyvinyl derivatives (e.g., polyvinyl alcohol), chondroitin sulfate, and sodium hyaluronate. In mild-to-moderate cases, they

Corresponding author-
Dr. Prerana Agarwal, MS,
Assistant Professor, Department of Ophthalmology,
Saraswathi Institute of Medical Sciences Hapur, U.P (India) Email: docprernaagarwal@gmail.com

DOI Number: 10.5958/0976-5506.2019.00681.8
are the mainstay of treatment. Artificial tears act by replenishing the deficient aqueous layer of the tear film and diluting the inflammatory cytokines.\textsuperscript{2,3} Cyclosporine 0.05% emulsion has been approved by the US FDA for its treatment. Given the role of inflammation in dry eye, it makes sense that anti-inflammatory agents have been evaluated in its treatment.\textsuperscript{4}

These are lack of studies regarding this topic in this area so we did this study to see efficacy of these two treatment over each other.

**Material and Method**

A comparative prospective study was carried out at Saraswathi Institute Of Medical Sciences Anwarpur(Hapur). Patients were enrolled from February 2018 to July 2018. 20 patients i.e 40 eyes were included in each group presenting with dry eye in eye OPD. Patients were randomly divided in two groups. Detailed history was taken. Appropriate laboratory work up was done. Group 1 where patients used carboxy methyl cellulose .5% eye drops for treatment of dry eye. Group 2 in which patients used 0.5% carboxy methyl cellulose eye drops along with 0.05% cyclosporin ophthalmic emulsion for treatment of dry eyes. All patients were evaluated on day 0, 2 weeks, 1 month, 3 month and 6 month for relief in ocular symptoms and diagnostic dry eye test were done. Diagnostic dry eye test included SCH—Schirmer’s test, TBUT—tear breakup time, FLU—fluorescein stain, Rose Bengal staining and marginal tear strip test. Each ocular symptom (ocular discomfort, dryness, tearing) and dry eye test were scored from 0 to 3 depending on severity and combined score of all symptoms and test was calculated on each follow up visit for each eye individually of each patient in both groups. Net score was calculated as difference between total score (of all symptoms and test) on day 0 and total score at 6 month follow up. Net score actually gives improvement score after use of drug for 6 months in both groups. Net score is then compared in both groups to find the comparative efficacy of drugs in both groups. Net score in both groups wascompared using unpaired t test This study was approved by institutional ethics committee

**Results**

<table>
<thead>
<tr>
<th>Table 1: Distribution of cases as per age</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameters</strong></td>
</tr>
<tr>
<td>Total cases</td>
</tr>
<tr>
<td>Age (Mean±SD)</td>
</tr>
<tr>
<td>Gender (M:F)</td>
</tr>
</tbody>
</table>

The mean age in group I was 39.72 ± 6.85 years and in group II was 40.2 ± 5.28 years.

**Diagram 1: Distribution as per symptoms.**

Ocular discomfort, dryness and tearing was seen in all the cases.

<table>
<thead>
<tr>
<th>Table 2: Parameters in both the groups on day 0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parameters</strong></td>
</tr>
<tr>
<td>Marginal tear strip test</td>
</tr>
<tr>
<td>SCH</td>
</tr>
<tr>
<td>TUBT</td>
</tr>
<tr>
<td>FLU</td>
</tr>
<tr>
<td>Rose Bengal staining</td>
</tr>
<tr>
<td>Ocular discomfort</td>
</tr>
<tr>
<td>Foreign body sensation</td>
</tr>
<tr>
<td>dryness</td>
</tr>
<tr>
<td>Itching</td>
</tr>
<tr>
<td>Photophobia</td>
</tr>
<tr>
<td>Tearing</td>
</tr>
</tbody>
</table>

SCH—Schirmer’s test, TBUT—tear breakup time, FLU—fluorescein stain
Table 3: Different parameters in group I and group II after 6months

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group I Mean score</th>
<th>Group II Mean score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marginal tear strip test</td>
<td>0.62</td>
<td>0.15</td>
</tr>
<tr>
<td>SCH</td>
<td>0.55</td>
<td>0.30</td>
</tr>
<tr>
<td>TUBT</td>
<td>0.25</td>
<td>0.27</td>
</tr>
<tr>
<td>FLU</td>
<td>0.40</td>
<td>0.05</td>
</tr>
<tr>
<td>Rose Bengal staining</td>
<td>0.42</td>
<td>0.25</td>
</tr>
<tr>
<td>Ocular discomfort</td>
<td>0.65</td>
<td>0.32</td>
</tr>
<tr>
<td>Foreign body sensation</td>
<td>0.65</td>
<td>0.37</td>
</tr>
<tr>
<td>dryness</td>
<td>0.72</td>
<td>0.42</td>
</tr>
<tr>
<td>Itching</td>
<td>0.20</td>
<td>0.07</td>
</tr>
<tr>
<td>Photophobia</td>
<td>0.35</td>
<td>0.12</td>
</tr>
<tr>
<td>Tearing</td>
<td>0.95</td>
<td>0.40</td>
</tr>
</tbody>
</table>

Mean net score in group 1=13.75
Mean net score in group 2=15.7
Net score in group 2 is more than group 1

The difference in net score of 40 eyes from each group was found to be statistically significant p<0.05(unpaired t-test)

**Discussion**

Dry eye is a common complaint among middle-aged and older adults and its prevalence increases progressively with age. Studies from India reported that the prevalence varies between 18.4% and 63%. This was a comparative study conducted on 40 dry eye cases presenting to eye OPD. The mean age in group I was 36.72 ± 6.85 years and group II was 38 ± 5.28 years respectively. Similar study was concluded by Shah S et al. In the present study the male to female ratio was 1:1 with 21 (52.5%) males and 19 (47.5%) females. This was in accordance with Shah S et al. where the ratio was 1:1. On the contrary Female dominance was reported by Behera S et al.

In the present study middle age formed 60% of the study group patients. Similar higher middle age population was seen with Shah S et al, Kamalakshy J et al and Titiyal JS et al study.

Majority of patients reported dramatic symptomatic relief during treatment period. Patients showed improvement in terms of decrease in score values at different follow ups. All patients had relief in foreign body sensation, discomfort, tearing, photophobia, dryness and itching. At the end of study i.e. at 6 months, eyes having score 03 for different symptoms were 0 in both groups, those with moderate score02 for different symptoms were more in group 1 as compared to group 2 and greater percentage of eyes from group 2 had score 0 for different ocular symptoms.

In the present study ocular discomfort, dryness, tearing was seen in all cases. While in Kamalakshy J et al most frequent ocular surface symptom in confirmed cases of dry eye was itching. In another study by Lee AJ et al conducted in Indonesia burning sensation was the most common symptom.
In this study use of topical cyclosporine 0.05% and CMC 0.5% in group II showed significant improvement in all the parameters specially TBUT which was in accordance to other studies like Shah S et al10, Byun YJ et al17. Sall K et al.18 This is explained by the fact that the ocular surface, lacrimal glands and the neuronal feedback loop that make up a single functional unit for the maintenance of ocular surface homeostasis leading to improvement of the ocular surface Sall K et al.19 Sall K et al19 showed significant decrease in sandy or gritty feeling, dryness, itching and blurred vision in patients treated with cyclosporine 0.05%. A study by Cross WD et al22 showed improvement in signs and symptoms of dry eye diseases in patients treated with cyclosporine 2% Study by Sodhi et al23 showed statistically significant improvement in only lacrimation and photophobia in patients treated with cyclosporine 2% while none of the ocular complaints showed significant improvement in patients treated with artificial tear eye drops. In our study results show better relief in all ocular symptoms in group 2. Therefore our study is in accordance with study of Sall K et al 19 Cross WD et al22 but not in accordance with study of Sodhi et al 23. Difference could be because of the fact that all patients enrolled in study by Sodhi et al were of non immune origin and cyclosporine has immunomodulatory role.

Mean net score in group 2 was more than group 1 indicating more improvement in group 2. Difference in net score in both groups was found to be statistically significant. A recent study by Sal KN et al on American patients has also shown improvement in ocular symptoms and tear film tests value with combination of cyclosporine and artificial tear eye drops24.

In our study, none of the patients showed any drug related adverse effects which was consistent Shah S et al10, Kinoshita S et al20 and Small DS et al.21

**Conclusion**

Present study concludes that there is statistically significant difference in response (in terms of improvement in tear film profile tests and ocular symptoms) in patients treated with combination of cyclosporine 0.05% and CMC 0.5% drops as compared to patients treated with 0.5% CMC eye drops only. It also strengthens the fact that topical cyclosporine A 0.05% twice daily plus CMC 0.5% has no adverse effect.

**Conflict of Interest**- NIL

**Source of Funding**- The study was carried out at Saraswathi Institute Of Medical Sciences, Hapur and no extra financial support was required.

**Ethical Clearance**- Ethics committee approval was obtained before study

**References**


23. Sall K N, Cohen SM, Christensen MT, Stein JM. An evaluation of the efficacy of a cyclosporine based dry eye therapy when used with marketed artificial tears as supportive therapy in dry eye. Eye Contact Lens 2006;32(1):21-6
A Survey of Machine Learning Techniques for Cancer Disease Prediction and Diagnosis

M Kiran Kumar1, Divya Udayan J2

1School of Computer Science and Engineering, 2School of Information Technology and Engineering, VIT, Vellore, India

Abstract

Identification of patterns plays a vital role in Disease Diagnosis for detecting the diseases accurately. Machine learning is a subfield of artificial intelligence (AI). This ML techniques are mostly interesting as it is part of a suggesting personalized, predictive medicine to the diseases. Cancer is the one of the second leading cause of death worldwide, in 2018 it is accountable for an estimated 9.7 million deaths. The most common cancers are breast, oral, skin, colon and lung. Cancer death will be reduced if cases are identified and treated early.

In connection with this review a broad survey is conducted for various machine learning algorithms used for prediction and prognosis of different cancer diseases. A number of methods are reviewed, towards various types of cancer diseases, a heavy reliance on “historical” technologies used in machine learning methods. At the end the benefits & limitations & challenges are identified which helps the researches to develop novel methodologies in ML to improve the performance in disease prediction and diagnosis.

Keywords: Machine learning, Medical diagnosis, Classification algorithms, Decision trees, KNN, ANN, SVM

Introduction

Now a Days, artificial intelligence generate more imaginative machine in computer science. Learning system becomes a basic requirement for an imaginative system. Many researchers currently acknowledge that without learning system, machine can’t produce efficient results. Therefore, Machine Learning (ML) is prevailing divisions of artificial intelligence. These are used to analysis data repeatedly to produce most efficient outputs. Currently machine learning offers crucial machine for imaginative data analyzation. Presently medical organizations are very well equipped with completely automatic machines and those machines are producing large amount of data, these data is collected and shared with computer systems or with consultant to take essential phases These techniques are used to analysis the medical data and it cooperates in medical diagnosis for detecting various dedicated diagnostic problems. With machine learning classification algorithms, for specific disease, improve the accuracy, speed, reliability and performance of the investigative on the present system.

ML is capable of present automatic learning methods to extract common patterns from genuine data and produce precise decisions through different learning behavior. In this survey, we tried to explore the issues of present system related to cancer disease prediction.

The rest of this paper is structured as follows. Section 2 presents the overview of research area. Section 3 presents the cancer disease diagnosis and prediction by using various ML algorithms and survey. Finally, Section 4 concludes with some indication for future work.

Machine Learning

Machine learning is the sub field of AI.it uses variety of statistical and optimization techniques to the computer to learn and improve the performance without being explicitly programmed1. Machine Learning Algorithms are commonly they can be divided into categories according to their purpose and the main
categories are the following:

**Supervised learning**

**Unsupervised learning**

**Semi supervised learning**

**Reinforcement learning**

**Evolutionary Learning**

**Deep learning**

Diagnosis of cancer by Using Different Machine Learning Algorithms

In the last two decades, many researchers started investigating on different machine learning algorithms for diagnosing the diseases\(^2,6\). They accepted that machine-learning algorithms provide good prediction for different diseases\(^10\). In this survey paper a detailed diseases diagnoses for various cancers like skin, lung, breast, oral, liver is been provided. Cancer prognosis prediction improves the quality of treatment and increases the patient’s survivability\(^6\).

In cancer prediction there are three predictive objectives:

*Prediction of cancer susceptibility*: predict the chance of developing cancer earlier to the occurrence of the disease.

*Prediction of Cancer Survivability*: predict an outcome like life expectation, advancement after finding of the malignant tumors.

*Cancer Recurrence prediction*: Quality articulation profiles have been utilized to foresee cancer repeat or other clinical results of patients.

This survey focuses on the application of machine learning approaches for predicting the various types of cancer. A standout amongst the most usually happening malignancies is oral cancer. Oral cancer starts in the oral hole which incorporates the whole mouth, lips, the inward coating of the lips and cheeks, the teeth gums, tongue. According to Fang et al\(^3\) Wang et al\(^4\), tobacco consumption will cause the tumor cell to dedifferentiate which makes them become more aggressive A great deal of work has been anticipated as of late in writing for the oral cancer classification and some vital work is assessed in this paper. Yung-nien\(^5\) developed color based tumor segmentation for the automated estimation of oral cancer parameters.

Skin cancer is the most common human malignancy. Every year more than 5.4 million new cases of skin cancer diagnosed in US. Melanoma is the most deadly form of skin cancer, more than 75% of deaths associated with skin cancer\(^7\). Exact identification of growth would help sparing millions of lives. S. Mustafa\(^14\) applied sequential backward selection feature selection to improve Classification accuracy based on 6-9 useful features. Obtained the highest 91.30% by using KNN classifier. Li,Yuexiang\(^35\) developed deep learning frameworks, which are Lesion Indexing Network (LIN) and the Lesion Feature Network (LFN), the proposed LIN obtained highest accuracy 85.7 and AUC 91.2 by considering Lesion Classification. He has taken the ISIC 2017 dataset.

Lung cancer is a dangerous one among all cancer leading deaths, due to last stage exposure and environmental conditions like air pollution, smoking habits\(^9\). A recent papers from Bram van Ginneken et al\(^8\) and other authors discussed using the pre-trained convolutional neural network and genetic algorithm to classify regions from chest CT scan images as nodule or non-nodule Safiyari Proposed eight classification algorithms including RIPPER, Decision Stump, Simple Cart, C4.5, SMO, Logistic Regression, Bayes Net and Random Forest to diagnose lung cancer. They used AdaBoost algorithm to improve the accuracy of three algorithms RIPPER, decision stump, SMO. Rossetto\(^40\) used Convolution Neural Networks using multiple preprocessing methods in order to increase the accuracy which is 97.5%. Chip M.Lynch, proposed supervised learning technique SVM to lung cancer data in the SEER database for estimate patient survival time.

Liver cancer can be genetic or affected by a range of factors that harm the liver, such as viruses and alcohol use and obesity is also related with liver damage\(^9\). However, only few works in machine learning examine liver disorders, although this disease is aggressively growing and becoming one of the most deadly diseases in more countries.

Colorectal cancer (CRC) is one of the third largest cancer in the United States, it is one of the leading causes of cancer deaths. Like other types of cancers, we can reduce the death rate by an early detection. There
are a variety of diagnostic techniques like fecal occult blood test, stool test sigmoidoscopy etc. So many researchers developed an automated diagnostic system which can identify the different types.

**Table 1: Comprehensive view of ML Algorithms used for cancer susceptibility, recurrence and Survivability prediction**

<table>
<thead>
<tr>
<th>Publication</th>
<th>Cancer type</th>
<th>ML method</th>
<th>Important considered</th>
<th>Types of data</th>
<th>Clinical end point</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jennifer Listgarten</td>
<td>Breast</td>
<td>SVM-QK</td>
<td>Tumor pathophysiology</td>
<td>Genomic</td>
<td>Susceptibility</td>
<td>69</td>
</tr>
<tr>
<td>Xu X</td>
<td>Breast</td>
<td>SVM</td>
<td>Gene signature</td>
<td>Genomic</td>
<td>Survivability</td>
<td>97</td>
</tr>
<tr>
<td>Gevaert O et al.</td>
<td>Breast</td>
<td>BN</td>
<td>Age, grade, MMP9, HRASLA</td>
<td>Clinical, microarray</td>
<td>Survivability</td>
<td>85</td>
</tr>
<tr>
<td>Noushin Jafarpisheh</td>
<td>Breast</td>
<td>NN</td>
<td>Tumor pathophysiology</td>
<td>Clinical</td>
<td>Recurrence</td>
<td>94.3</td>
</tr>
<tr>
<td>Tan, Mei et al.</td>
<td>Oral</td>
<td>GP</td>
<td>smoking, drinking, chewing, oncogene p63</td>
<td>Clinical</td>
<td>Survivability</td>
<td>83.8</td>
</tr>
<tr>
<td>Wafaa K. Sham</td>
<td>Oral</td>
<td>DNN</td>
<td>gene microarray</td>
<td>Genomic and clinic</td>
<td>Susceptibility</td>
<td>96.5</td>
</tr>
<tr>
<td>Exarches K et al.</td>
<td>Oral</td>
<td>BN</td>
<td>Smoker, tumor spreading, TCAM, SOD2</td>
<td>Clinical</td>
<td>Recurrence</td>
<td>100</td>
</tr>
<tr>
<td>Chang S-W</td>
<td>Oral</td>
<td>SVM</td>
<td>Drink, invasion, p63 gene</td>
<td>Clinical, Genomic</td>
<td>Survivability</td>
<td>75</td>
</tr>
<tr>
<td>Waddell M et al.</td>
<td>Multiple myeloma</td>
<td>SVM</td>
<td>Snps</td>
<td>Snps</td>
<td>Susceptibility</td>
<td>71</td>
</tr>
<tr>
<td>S. Kim</td>
<td>Liver</td>
<td>FNN</td>
<td>blood test, Biopsy</td>
<td>Clinical</td>
<td>Survivability</td>
<td>99.1</td>
</tr>
<tr>
<td>Kim YS</td>
<td>Liver</td>
<td>ANN</td>
<td>Serum lipid</td>
<td>Clinical</td>
<td>Susceptibility</td>
<td>72</td>
</tr>
<tr>
<td>Haramoto I</td>
<td>Liver</td>
<td>ANN</td>
<td>Age, TB, DB, ALP, ALT etc</td>
<td>Clinical</td>
<td>Survivability</td>
<td>99</td>
</tr>
<tr>
<td>Stajadinovic</td>
<td>CRC</td>
<td>BN</td>
<td>tumor histology,</td>
<td>Clinical</td>
<td>Susceptibility</td>
<td>71</td>
</tr>
<tr>
<td>S. Rathore</td>
<td>CRC</td>
<td>SVM GECC</td>
<td>blood test, stool test sigmoidoscopy</td>
<td>Clinical</td>
<td>Susceptibility</td>
<td>98.7</td>
</tr>
<tr>
<td>Kim W</td>
<td>CRC</td>
<td>SVM</td>
<td>Local invasion of tumor</td>
<td>Clinical, Pathologic</td>
<td>Recurrence</td>
<td>89</td>
</tr>
<tr>
<td>Kaiserman</td>
<td>Skin</td>
<td>ANN</td>
<td>Blood sample</td>
<td>Clinical</td>
<td>Survivability</td>
<td>84</td>
</tr>
<tr>
<td>Taktak AF</td>
<td>Skin</td>
<td>ANN</td>
<td>coronal and sagittal tumor location, anterior tumor margin</td>
<td>Clinical</td>
<td>Survivability</td>
<td>72</td>
</tr>
<tr>
<td>Sierra</td>
<td>Skin</td>
<td>Genetic Algorithm</td>
<td>Skin melanoma</td>
<td>Clinical</td>
<td>Survivability</td>
<td>94</td>
</tr>
<tr>
<td>Mian S</td>
<td>Skin</td>
<td>ANN</td>
<td>Blood sample, tumor</td>
<td>Proteomic</td>
<td>Recurrence</td>
<td>88</td>
</tr>
<tr>
<td>S. Mustafa</td>
<td>Skin</td>
<td>KNN</td>
<td>Images</td>
<td>Clinical</td>
<td>Survivability</td>
<td>91.30</td>
</tr>
<tr>
<td>Li, Yuxiang</td>
<td>Skin</td>
<td>LIN</td>
<td>Images</td>
<td>Clinical</td>
<td>Susceptibility</td>
<td>85.7</td>
</tr>
<tr>
<td>Chen Y</td>
<td>Lung</td>
<td>ANN</td>
<td>Sex, genes ag_stag, LCK</td>
<td>Clinical</td>
<td>Survivability</td>
<td>83.5</td>
</tr>
<tr>
<td>Qing Wu</td>
<td>Lung</td>
<td>NN- EDM</td>
<td>CT images</td>
<td>Clinical</td>
<td>Recurrence</td>
<td>77.8</td>
</tr>
<tr>
<td>Santos-Garcia G</td>
<td>Lung</td>
<td>ANN</td>
<td>sex, age, body mass index, ischemic heart disease, cardiac arrhythmia</td>
<td>Clinical</td>
<td>Survivability</td>
<td>98</td>
</tr>
<tr>
<td>A. Safiyari</td>
<td>Lung</td>
<td>Ada Boost</td>
<td>computed tomography images</td>
<td>Clinical</td>
<td>Survivability</td>
<td>88.98</td>
</tr>
<tr>
<td>A. M. Rossetto</td>
<td>Lung</td>
<td>CNN</td>
<td>computed tomography images</td>
<td>Clinical</td>
<td>Survivability</td>
<td>97.5</td>
</tr>
</tbody>
</table>
There are a variety of openly available datasets from cancer disease expression studies, including leukemia cancer, colon cancer, and lung and breast cancer datasets.

**Evaluation of ML Algorithms**

Limitations of Machine Learning algorithms in cancer disease diagnose and prediction:

The benefits of machine learning transform to innovative decision making and prediction process that improve the way of disease prediction. The limitations of machine learning techniques in disease prediction are listed below:

*Error diagnosis and correction in disease prediction:* One important limitation of machine learning is its vulnerability to errors in prediction. The original problem with this expected fact is that when they do make errors, diagnosing and correcting these are difficult because it produces underlying complexities of the algorithms and associated methods.

*Time constraints in learning and diagnose process:* It is incredible to design immediate accurate predictions for diseases with a machine learning system. It trains with historical data. The larger the data size and longer it is exposed, the better it will execute.

*Problems with verification and validation:* Another limitation of ML in decision making and prediction is the lack knowledge in diversity of data. The ML deals with statistical truths rather than literal truths. When the data is not included in the historical data, it is very difficult methods are suitable in all kind of diseases.

Open Issues / Research Challenges in Cancer disease Prediction and diagnosis

*Lack of attention paid to data size and learner validation.* Basic requirement for the machine learning approach is comprising a sufficient and large data set. Data set is separated into training data sets and test data sets or some logical form of n-fold cross validation for smaller data sets like 5- or 10-fold cross-validation is sufficient to validate most any learning algorithm. But in realistic sense these not enough to validate the efficiency of the method, because the accuracy of the testing is proportional to the amount of data trained.

*Data set quality and feature selection:* Along with data size data set quality and careful feature selection are also influences the effective machine learning approaches. Identification and selection of appropriate feature specific to the disease is very important but unfortunately, the methods in use to certify data quality and integrity are rarely discussed in most relevant papers.

*Availability of datasets:* It is very difficult to get the bench mark datasets for verifying and validating the Diseases particularly cancer disease. The type of features and number of feature are varied from disease to disease in such cases the dataset using for training the ML system be flaw less and accurate then only it is possible to get the accurate results in testing phase.

**Conclusion**

In this survey, we clearly discussed the concepts of machine learning and role of their application in cancer prediction or diagnosis. Different researchers have been proposed different techniques to predict the cancer disorder and focus on the development of predictive models using classification algorithms aiming to predict valid disease outcomes. Remember that there are various methods to design, develop and deploy a machine learning system for cancer disease prediction and diagnose to improve detection, classification, and characterization, among various diseases accurately with minimum time and efforts. The advantages of a ML system depend on how it is designed and developed for a particular disease prediction and detection. Furthermore, the limitations of ML are dependent on the type of technique or method used to define the prediction system for a specific disease.

**Conflict of Interest**- Nil

**Source of Funding**- Self

**Ethical Clearance**- Not Required

**References**

3. Fang et al. “Histological differentiation of primary oral squamous cell carcinomas in an area of betel


9. Rong-Ho Lin, “An Intelligent Model for Liver Disease Diagnosis,” Artificial Intelligence in Medicine, 2009” https://doi.org/10.1016/j.artmed.2009.05.005


24. Kim YS, Sohn SY, Kim DK, et al. “Screening test


Attitudinal Parameters Influencing Treatment Seeking Behavior during Child Diarrhea in India

Surya AV\textsuperscript{1}, Sanjeev MA\textsuperscript{2}, Rahul Sharma\textsuperscript{3}

\textsuperscript{1}South Asia CEO, Kantar Public, \textsuperscript{2}Associate Professor – Jaipuria Institute of Management, \textsuperscript{3}Associate Professor, Jaypee Business School

Abstract

Not seeking timely, correct and comprehensive treatment during childhood diarrheal episodes can potentially increase the risk of child morbidity and mortality. Treatment seeking behavior of parents/ primary care givers (P/ PCG) is very critical to reduce such risks among children below 5 years of age. However, P/PCG’s behavior to seek timely, correct and complete treatment, during child diarrhea episodes, is significantly impacted by many factors which include attitudinal parameters and demographic factors like the education and working status of the P/PCG and gender of the child, among others. This study is an attempt to specifically understand the attitudinal parameters in health seeking behavior, among P/PCG of children below 5 years, in case of childhood diarrhea

Keywords: childhood diarrhea, child mortality, child morbidity, health-seeking behaviour, diarrhea care.

Introduction

Diarrhea is one of the major causes of childhood mortality in India. Despite many efforts by the government to provide sufficient preventive care and treatment services, there are various factors that Impair the uptake of appropriate, sufficient and timely treatment services in India during episodes of childhood diarrhea. Acute diarrhea could lead to fluid loss, which can be life-threatening especially in young children. As per UNICEF\textsuperscript{1} statistics, diarrheal diseases account for nearly 1.3 million deaths a year among children in the age group of under-five years and this is more than all deaths due to AIDS, measles and malaria combined (Wardlaw et al)\textsuperscript{2}. Five countries - India, Ethiopia, Nigeria, Pakistan and Afghanistan- contribute to more than 50% of the diarrheal deaths; which otherwise is preventable as well as treatable (UNICEF)\textsuperscript{1}. In India diarrhea accounts for 13% of all deaths of children under 5 years of age killing about 300,000 under 5 children every year, making it the third most common cause of death for this age group (Lakshminarayanan & Jayalakshmy)\textsuperscript{3}. According to them poor sanitation and personal hygiene, lack of clean drinking water, and malnutrition are some of the factors associated with high incidence of diarrhea among children.

Literature Review

The treatment of infectious diseases, like diarrhea, is largely depended on the public healthcare expenditure and infrastructures – as the incidence is higher among the weaker section of the economy (Avachat et al)\textsuperscript{4} however they are easily manageable. Another factor that affects the management of infectious disease is the poor levels of education and hygiene among the poor making them more prone to such infections (Griffiths & Zhou)\textsuperscript{5}. Apart from these; treatment of any disease, including infectious ones, are affected by patient’s health seeking behavior (HSB). Previous studies have investigated factors that influence the HSB during childhood diarrhea. While studying factors affecting decision to seek treatment for children (including diarrhea) in Kerala; (Pillai et al)\textsuperscript{6} found that social, economic, disease related variables & gender of the child influenced whether, when and what kind of treatment was sought for the child. In a study of healthcare seeking in rural district (Patil & Dixit)\textsuperscript{7} found that the mother’s knowledge, the source of information,
family income, cast and social norms influenced HSB during diarrheal episodes. A study (Malhotra & Choy) based on the FHS 2007 found that mother’s age & education, wealth index, health knowledge, low use of public health facilities & child’s gender affected treatment seeking behavior in childhood diarrhea in India. Most of the research aims at ascertaining the behavior as influenced by demographic factors like education, skill, income, gender etcetera. However, treatment seeking is also dependent on other social and behavioural attitudes like what are the outcome expectation of the P/PCG (whether the child will be cured or not), general healthcare attitude (whether healthcare expenditure is considered an expense or investment), social attitudes towards diarrhea (is it a normal part of growing up that need not be accorded too much importance), the understanding of the urgency of the situation (coming from the knowledge about the disease), and the freedom to act in times of need. The current study considers 7 attitudinal parameters for its impact on health seeking behavior, during childhood diarrhea, in 4 rural districts of Uttar Pradesh. A functional definition of the 7 parameters are given below.

Healthcare Attitudes: indicates the P/PCG’s attitude towards children’s health and the need to invest in the same

Outcome Expectations: indicates how the P/PCG’s perceive the result of a medical intervention to be when provided to the patient

Economic Attitude: indicates the P/PCG’s attitude towards spending money on treating sickness in children.

Behavioral Urgency: indicates the urgency shown by the P/PCG’s to act in case of childhood illness like diarrhea.

Social Norms: indicates the tendency to confirm to the existing social norms, without challenging it, regarding treatment of childhood illness in the social setting of the P/PCG’s.

Behavioural Freedom: indicates the relative freedom the P/PCG’s in deciding on seeking medical care for the sick child.

Prevention attitude: indicates importance assigned by the P/PCG’s to preventing instances of diarrhea in children.

All the sentences were measured on a 5-point Liker’s scale of the ‘agreement’ type, using 3 sentences each, and composite scores were calculated for all the 7 factors applying negative scoring whenever appropriate.

Research Objectives

The objectives of this primary research was two-fold

Firstly, the study aims to understand the impact of the attitudinal parameters on ‘whether healthcare intervention was sought’.

Secondly, it ascertains whether the treatment ‘was the treatment sought timely’.

Research Methodology

The study, conducted with 960 P/PCGs in the state of Uttar Pradesh, adopts a cross-sectional design. The geographical scope of the study was restricted to the 4 districts of Uttar Pradesh state that included Jalaun, Hardoi, Barelliy & Rae Bareli. The sampling method used was stratified-multi-sage cluster sampling. Samples have been equally distributed across each of the districts sampled proportionate to the child population (child under 5 years). In each of the districts, the sample has been further distributed across urban and rural areas proportionate to the under 5 child population. Further, primary sampling units (PSU), that included wards and villages, have been selected through PPS (Probability Proportionate to Size) sampling. All households with at least one child affected by diarrhea, in the past fortnight, in each PSU were considered for the sampling frame.

At the sampled household, a detailed interviewer administered questionnaire was used to collect data from the P/PCG of the child. The interview was conducted only after seeking informed consent by the research team. It was ensured that research ethics including respondent confidentiality, right to refusal, voluntary participation, providing complete information about the study and its risks and benefits and ensuring privacy during the interview, were followed.

Analysis & Discussion

The data was analysed using SPSS version 19.0 (© Copyright SPSS Inc. 1989, 2010) and included cross tabulation, chi-square & logistic regression. The results of the various analysis are discussed separately.
Descriptive

The overall prevalence of diarrhea was 19.4% across all surveyed households (Table 1) and similar to a meta-analysis of prevalence rates between 2002 and 2013 (Ganguly et al)\(^9\). Out of 83.9% caregivers who took their children for a treatment to a medical facility; majority approached a government clinic (31.1%).

It can be observed that the proportion of caretakers who have taken the child to the medical facility for treatment during the diarrhea is significantly lower among the non-working parents compared to that of the working parents (64.7% vs 84.6%, \(p<0.05\)).

Logistic Regression: Binary logistic regression was run to understand the impact of 7 independent variables, the attitudinal parameters, on the treatment seeking behavior. The treatment seeking behavior studied were ‘whether the patient sought outside medical treatment or not’ and ‘whether the treatment was sought timely or not’. The interpretations of the two analysis are done separately.

Seeking of medical treatment: The overall model, to understand the influence of the Independent Variables (IVs) on whether the P/PCG would seek medical treatment, indicated a good model fit (chi-square=122.3, Nagalkereke R=0.50, \(p<0.01\)) (table 5). The Hosmer & Lomeshow test also indicated model fit (chi-square=21.69, \(p=0.186\)).

The overall prediction accuracy was 83.2%; with a higher ability to predict patients who would seek treatment (97.3%) than those who would not (10.3%).

An examination of the exponential B/ odds ratio indicated that only 4 of the IVs were significant in predicting the whether the patient would seek medical treatment, in case of diarrhea, and included patient’s outcome expectation, attitude to prevention, behavioral freedom & behavioral urgency (Table 2).

Table 1: Prevalence of Diarrhea among children under 5

<table>
<thead>
<tr>
<th>Parameter</th>
<th>N</th>
<th>as % of Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea prevalence-total</td>
<td>19200</td>
<td>19.4</td>
</tr>
<tr>
<td>Diarrhea prevalence-urban</td>
<td>6336</td>
<td>13.4</td>
</tr>
<tr>
<td>Diarrhea prevalence-rural</td>
<td>12864</td>
<td>21.8</td>
</tr>
<tr>
<td>Diarrhea prevalence-male</td>
<td>9792</td>
<td>20.2</td>
</tr>
<tr>
<td>Diarrhea prevalence-female</td>
<td>9408</td>
<td>18.6</td>
</tr>
</tbody>
</table>

Source: Survey data

The diarrhea prevalence is significantly higher in rural areas (21.8%) compared to the urban areas (13.4%) (\(p<0.05\)) and may be attributed to better awareness and hygiene among the urban households. Incidence of diarrhea is higher among the male children (20.2%) compared to the female children (18.6%) (\(p<0.05\)); which may be attributed to the fact that male children may be having more outdoor activities unsupervised in comparison to the girls.

Seeking treatment from a health facility, and not relying on the self-medication and home-remedies, is the most recommended method for treating childhood diarrhea. There are many households which report reliance on home-remedies across various studies (Carter et al)\(^10\). These households could be doing that for various reasons be it economic, lack of access to proper medical services or because of their beliefs around diarrhea or even lack of understanding of the seriousness of the disease (Nasrin et al)\(^11\). A significant majority of the caretakers took children for treatment in case of diarrhea episode (83.9%). The figures were similar to that reported from other developing countries like Niger (Anne-Laure et al)\(^12\) and Sierra Leone (Theresa et al)\(^13\) Out of 83.9% caregivers who took their children for a treatment to a medical facility; majority approached a government clinic (31.1%).

The diarrhea prevalence is significantly higher in rural areas (21.8%) compared to the urban areas (13.4%) (\(p<0.05\)) and may be attributed to better awareness and hygiene among the urban households. Incidence of diarrhea is higher among the male children (20.2%) compared to the female children (18.6%) (\(p<0.05\)); which may be attributed to the fact that male children may be having more outdoor activities unsupervised in comparison to the girls.

Seeking treatment from a health facility, and not relying on the self-medication and home-remedies, is the most recommended method for treating childhood diarrhea. There are many households which report reliance on home-remedies across various studies (Carter et al)\(^10\). These households could be doing that for various reasons be it economic, lack of access to proper medical services or because of their beliefs around diarrhea or even lack of understanding of the seriousness of the disease (Nasrin et al)\(^11\). A significant majority of the caretakers took children for treatment in case of diarrhea episode (83.9%). The figures were similar to that reported from other developing countries like Niger (Anne-Laure et al)\(^12\) and Sierra Leone (Theresa et al)\(^13\) Out of 83.9% caregivers who took their children for a treatment to a medical facility; majority approached a government clinic (31.1%).

It can be observed that the proportion of caretakers who have taken the child to the medical facility for treatment during the diarrhea is significantly lower among the non-working parents compared to that of the working parents (64.7% vs 84.6%, \(p<0.05\)).

Logistic Regression: Binary logistic regression was run to understand the impact of 7 independent variables, the attitudinal parameters, on the treatment seeking behavior. The treatment seeking behavior studied were ‘whether the patient sought outside medical treatment or not’ and ‘whether the treatment was sought timely or not’. The interpretations of the two analysis are done separately.

Seeking of medical treatment: The overall model, to understand the influence of the Independent Variables (IVs) on whether the P/PCG would seek medical treatment, indicated a good model fit (chi-square=122.3, Nagalkereke R=0.50, \(p<0.01\)) (table 5). The Hosmer & Lomeshow test also indicated model fit (chi-square=21.69, \(p=0.186\)).

The overall prediction accuracy was 83.2%; with a higher ability to predict patients who would seek treatment (97.3%) than those who would not (10.3%).

An examination of the exponential B/ odds ratio indicated that only 4 of the IVs were significant in predicting the whether the patient would seek medical treatment, in case of diarrhea, and included patient’s outcome expectation, attitude to prevention, behavioral freedom & behavioral urgency (Table 2).
Table 2: Variables in the Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Attitude</td>
<td>.363</td>
<td>.413</td>
<td>.774</td>
<td>1</td>
<td>.379</td>
<td>1.438</td>
</tr>
<tr>
<td>Outcome Expectation</td>
<td>.437</td>
<td>.189</td>
<td>5.342</td>
<td>1</td>
<td>.021</td>
<td>1.547</td>
</tr>
<tr>
<td>Attitude to Prevention</td>
<td>-.747</td>
<td>.315</td>
<td>5.632</td>
<td>1</td>
<td>.018</td>
<td>.474</td>
</tr>
<tr>
<td>Behavioral Freedom</td>
<td>1.185</td>
<td>.287</td>
<td>17.091</td>
<td>1</td>
<td>.000</td>
<td>3.269</td>
</tr>
<tr>
<td>Economic Attitude</td>
<td>.345</td>
<td>.248</td>
<td>1.944</td>
<td>1</td>
<td>.163</td>
<td>1.412</td>
</tr>
<tr>
<td>Behavioral Urgency</td>
<td>.860</td>
<td>.224</td>
<td>14.745</td>
<td>1</td>
<td>.000</td>
<td>2.363</td>
</tr>
<tr>
<td>Social Norms</td>
<td>.102</td>
<td>.299</td>
<td>.117</td>
<td>1</td>
<td>.732</td>
<td>1.108</td>
</tr>
<tr>
<td>Constant</td>
<td>-11.732</td>
<td>1.234</td>
<td>90.441</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>

Attitude towards healthcare, economic attitude & social norms had no influence on whether outside treatment was sought or not along with social norms and family attitude. This may be due to the fact that kids are generally afforded higher importance and care in every household such that health investments on kids are considered a necessity and P/PCGs are not averse to spending on their children’s health.

**Seeking of timely treatment:** it is important that timely medical treatment is sought which will reduce cost, morbidity and mortality in child diarrhea. The logistic model to understand the influence of the IVs on whether timely treatment will be sought or not returned statistically significant model fit (chi-square=164.386, Nagalkereke R=0.235, p<0.01). The Hosmer & Lomeshow also indicated model fit (chi-square=15.36, p=0.052). The overall prediction accuracy was 79.3% with higher accuracy in predicting timely treatment sought (94.8%) than late/ untimely treatment (30.9%). The exponential B/ Odds ratio indicated that except for social norms and outcome expectations all other factors had a significant influence on whether timely medical treatment for diarrhea was sought or not (Table 3).

Table 3: Variables in the Equation

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Attitude</td>
<td>.903</td>
<td>.367</td>
<td>6.060</td>
<td>1</td>
<td>.014</td>
<td>2.468</td>
</tr>
<tr>
<td>Outcome Expectation</td>
<td>.153</td>
<td>.163</td>
<td>.882</td>
<td>1</td>
<td>.348</td>
<td>1.166</td>
</tr>
<tr>
<td>Attitude to Prevention</td>
<td>-.830</td>
<td>.274</td>
<td>9.203</td>
<td>1</td>
<td>.002</td>
<td>.436</td>
</tr>
<tr>
<td>Behavioral Freedom</td>
<td>1.029</td>
<td>.244</td>
<td>17.734</td>
<td>1</td>
<td>.000</td>
<td>2.799</td>
</tr>
<tr>
<td>Economic Attitude</td>
<td>1.215</td>
<td>.224</td>
<td>29.496</td>
<td>1</td>
<td>.000</td>
<td>3.370</td>
</tr>
<tr>
<td>Behavioral Urgency</td>
<td>.436</td>
<td>.183</td>
<td>5.675</td>
<td>1</td>
<td>.017</td>
<td>1.546</td>
</tr>
<tr>
<td>Social Norms</td>
<td>-.048</td>
<td>.259</td>
<td>.035</td>
<td>1</td>
<td>.853</td>
<td>.953</td>
</tr>
<tr>
<td>Constant</td>
<td>-11.807</td>
<td>1.146</td>
<td>106.095</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
</tr>
</tbody>
</table>
Conclusions

Successful provision of affordable healthcare to citizen should be the primary aim of any government as it has wide economic and social implications. This becomes more important when the disease is easily treatable, preventable and affects the younger populace; such as diarrhea. The current study finds that social norms, regarding treatment of diarrhea, has significantly undergone changes and is no more an influencing factor in treatment seeking during diarrheal episodes among children under 5 years of age. The factors that affect treatment seeking behavior are outcome expectation, behavioural freedom, behavioural urgency, attitude towards health care, economic attitude & attitude towards prevention of the P/PCG. Except in case of attitude towards prevention all others have a positive impact on health seeking behavior. People who have a positive attitude towards prevention may be better aware of the disease condition making them confident of their ability to handle the situation and delaying their responses to medical intervention. From the results we can propose a model to predict the treatment seeking behavior (Figure.1) that needs further empirical investigation. The proposed model does not include other demographic variables (other than economic factor), like gender, income, religion, caste or education of the P/PCG, which also may have influence on the treatment seeking behavior as shown by the earlier studies.

Policy Implications:

Government’s ambition to provide the best medical care, to children affected by diarrhea, is in the right direction and there has seen progressive efforts towards the same. It is clear from the results of the survey that the government should also develop special communication and outreach campaigns that highlight the importance of timely treatment of childhood diarrhea, the negative consequences of not doing (so as to improve behavioural urgency) and the need to prevent such easily preventable diseases (to improve the attitude towards prevention). From the supply point of view government should also consider reviewing the quality, affordability and accessibility of medical services that are available; especially in rural areas. Enlistment of technological advances, like tele-medicine and private medical service providers in a PPP (Public Private Partnership) like set up can be explored to make diarrheal treatment more reachable and affordable.

Limitations and Future Research:

This research primarily depends on the reported data from the parents about their HSB during the diarrheal episodes of the children. In most cases, the interviewers could verify the claims asking for the prescriptions from the caretakers but not in all cases caretakers could provide the prescriptions for various reasons including that they have not preserved them. The study did not control for the presence of health facilities as a sampling variable. This could mean that the access indicators to health facilities or types of health facilities cannot be generalized directly to the universe and should be considered as specific only to the sampled geographies.

Funding: The study was self-funded.

Conflict of Interest: NIL.

Ethics Clearance: Reviewed and certified by Social Research Institute (SRI)-IRB registered with the division of Assurance and Quality Improvement of the Office for Human Research Protections (OHRP), USA with Registration No. -: IORG0009562.
References


The Impact of Platelet Rich Fibrin on Periodontally Accelerated Osteogenic Orthodontics (PAOO)- A Perio-Ortho Interdisciplinary Case Report

Chatterjee Soham¹, Shetty J. Neetha², M.V Ashith³

¹Post Graduate, Dept. of Periodontology, ²Associate Professor, Dept of Periodontology, ³Reader, Dept of Orthodontics, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education (MAHE)

Abstract

Background: In the present day scenario as the number of adult patients presenting with severe teeth malocclusions increase, the orthodontic profession constantly debates on ways to accelerate tooth movement and focuses on improving the patient centered outcomes. PAOO, a surgically assisted orthodontic procedure, which combines the use of corticotomy along with bone grafts, has been used to fasten the clinical results. Platelet rich fibrin, (PRF), an autologous platelet concentrate, with its vast release of growth factors plays an important role in enhancing soft tissue outcomes.

Aim: This case report aimed to demonstrate the efficacy of PRF on soft tissue outcomes when used as an adjunct to a variation of PAOO technique and also assess the time duration to achieve complete space closure.

Case description: A 23 year old female patient had presented herself to the outpatient Department of Orthodontics, Manipal College of Dental Sciences, Mangalore, India, with a chief complaint of protruded upper anterior teeth. The patient had been diagnosed with Class 2 division 1 malocclusion, after which therapeutic extraction of upper 1st premolars and lower 2nd premolars were performed. To facilitate lower molar protraction, the patient was referred to the Dept. of Periodontology for PAOO procedure. PAOO procedure was performed along with PRF and the clinical outcomes were assessed at the end of 6 months.

Conclusion: Correction of severe crowding may pose a significant challenge to the orthodontist. A combination of PAOO with PRF has shown beneficial therapeutic outcomes, better patient acceptance and enhanced soft tissue healing. It would be a viable alternative to the invasive orthognathic surgery.

Clinical significance: PAOO when combined with PRF not only results in faster space closure but also the vast growth factors released from PRF not only improve post-operative healing, but also increases the soft tissue thickness.

Keywords: PAOO, PRF, Interdisciplinary

---

Case Report

Background: Periodontal accelerated osteogenic orthodontics (PAOO) entails procedures that include selective alveolar corticotomy, augmentation of alveolar bone by particulate bone grafting and application of orthodontic forces.¹² It is 2-3 times faster and requires 1/4rd to 1/3th the time required for the traditional orthodontic therapy due to the regional acceleratory
phenomenon (RAP).2,3,4 Platelet rich fibrin (PRF) is a blood-derived, autologous, second-generation platelet concentrate which plays an important role in increasing the gingival biotype and enhances the soft tissue healing.5,6 This case report, demonstrates the use of PAOO along with PRF to accelerate the orthodontic teeth movement, enhance the healing and increase the gingival biotype after 6 months.

Case Description

A 23 year old female patient had presented herself to the outpatient Department of Orthodontics, Manipal College of Dental Sciences, Mangalore, India, with a chief complaint of her upper front teeth being forwardly placed. The patient had been diagnosed with Class 2 division 1 malocclusion, for which therapeutic extraction of upper 1st premolars and lower 2nd premolars were performed. (Figure-1a & 1b). To facilitate lower molar protraction, the patient was referred to the Dept. of Periodontology, Manipal College of Dental Sciences, Mangalore, for undergoing the PAOO procedure. Patient underwent a complete haemogram test and an informed consent was obtained prior to the procedure.

The surgical site was anaesthetized with 2% lignocaine hydrochloride with 1:200000 adrenaline (LOX 2% adrenaline). The gingival biotype was measured with an endodontic K file number 15 (with stopper) pre-operatively and a 2mm thickness was recorded (Figure-2). Sulcular incisions were given using the BP blade number 12 extending from the distal aspect of the 1st premolar to the distal aspect of the first molar. After which, a vertical releasing incision using a BP blade number 15 was given distal to the first premolar extending beyond the muco-gingival junction. After which a full-thickness muco-periosteal flap was reflected.

With a micro motor straight hand piece and Tungsten Carbide round bur of diameter 1mm, vertical corticotomy grooves were made under continuous saline irrigation from the 2mm below the crest of the alveolar bone and extending 2-3mm beyond the root apex followed by joining of the labial and lingual grooves only at the edentulous area. The crestal bone was preserved around the adjacent tooth. Cortical perforations were made in between the vertical grooves on the labial as well as lingual aspect of the bone. (Figure-3)

The decorticated bone was filled with DFDBA. (Figure-4) and PRF membrane which was prepared by using 9ml of the patient’s blood and centrifuging it at 3000rpm.9 (Figure-5) Optimal amount of DFDBA was mixed with PRF and placed at the corticotomy sites. (Figure-6a & 6b)

The periodontal flap was approximated using 3/0 non-resorbable silk sutures in a tension free manner. (Figure-7) Periodontal pack was then placed. Capsule Amox 500 mg thrice daily for 5 days was prescribed as an antibiotic and tab Ultracet, 2 tablets daily for 5 days was prescribed as analgesic. The participants were instructed not to brush the operated area for 10 days. Post-operative instructions were given.

The patient was recalled after 10 days for removal of sutures and the patient was reviewed every week for the first month during which the oral hygiene instructions were reinforced.

Protraction force of about 150- 200gms was applied using elastic chains extending from molar to anterior retraction hook. Bimonthly activations were carried out thereafter to avail RAP phenomenon. Periodontal healing was assessed after 6 months. At the end of 6 months complete closure of the 4mm space was clinically observed and the gingival thickness of 3mm was recorded. (Figure-8)
Discussion

Orthodontic treatment in adult patients, have always been a challenge as they do not exhibit any further maxillo-mandibular growth as a result of reduced bone remodelling rate and increased bone mineral density and also there is a tendency to demonstrate increased risk of periodontal disease. Speeding up the treatment by applying increased orthodontic forces may result in increased chances of hyalinization. To overcome these drawbacks various surgical procedures and modifications have been attempted in the previous decades to obtain optimum clinical results.

Periodontally Accelerated Osteogenic Orthodontic procedure (PAOO) has been indicated when faster orthodontic treatment is desired, in moderate to severe crowding cases, Class II malocclusions requiring expansion and/or extractions, mild Class III malocclusions cases and extrusion for open bite and intrusion for deep bite cases. This technique also gained acceptance and popularity as it resulted in increased alveolar bone thickness, decreased treatment time, decreased amount of apical root resorption and enhanced post-treatment orthodontic stability. In this case report, the patient underwent PAOO procedure bilaterally and PRF was placed only on the 4th quadrant during the mesialisation of 46 in the place of previously extracted 45.

Platelet rich fibrin, a healing bio-material, possesses low thrombin concentration thus allowing the migration of endothelial cells and fibroblasts into the healing site.
It also permits a rapid angiogenesis, thus, showing potential for all types of superficial cutaneous and mucous healing. Platelet rich fibrin has also shown considerable results in increasing the gingival thickness. A study by Thamaraiselvan M. et al, comparing coronally Advanced Flap (CAF) with and without PRF in the treatment of gingival recession showed an increase in gingival thickness when PRF was used along with CAF.

In accordance with the above study, our case also demonstrated an increase in gingival thickness of around 1 mm after 6 months, even though it was used along with PAOO. The increase in soft tissue thickness may have been attributed to the several growth factors released by the platelet rich fibrin which may play a role in the proliferation of the gingival and periodontal ligament fibroblasts. Despite various advantages shown by this procedure, this technique had also previously reported few drawbacks such as, increased patient morbidity associated with the procedure due to its invasive nature, post-operative pain, swelling, risk of infection, avascular necrosis, decreased patient acceptance and damage to adjacent vital structures. However in this case report, healing was uneventful with resolution of inflammation and pain within 12 days, which is in accordance with the results of the study conducted by Munoz et al. Also, this case demonstrated a faster space closure within 4 months, compared to the time taken by the conventional procedure and the results are also in accordance with various reports and studies.

**Conclusion**

A combination therapy of PAOO with PRF tends to have a beneficial therapeutic result as the patients present with a reduce post-operative inflammation, decreased pain and reduced risk of infection without interfering with tooth movement or post-orthodontic stability. It also demonstrates an improved orthodontic treatment result along with reduction in various side effects such as root resorption, tooth devitalization and relapse of orthodontic treatment. Despite showing promising results in wound healing and soft tissue augmentation further well-designed and properly controlled studies have to be performed to validate these results.

**Acknowledgment:** Nil

**Informed consent:** Informed consent was obtained from the patient prior to the treatment.

**Conflict of Interest:** The authors report no conflict of interest related to the study.

**Source of Funding:** The authors reported that the present case report obtained no external source of funding, apart from the support of the authors’ institution.

**Ethical Clearance:** Ethical clearance was obtained from the Institutional ethical committee ethical clearance from the institutional ethical committee (Protocol Number: 16097), Manipal Academy of Higher Education (MAHE), India.

**References**


Role of Low Molecular Weight Heparin in Thromboprophylaxis for Hip and Knee Arthroplasty

Deepinder Chaudhary¹, Mahipat Singh¹, Manrattan Bhathal², Neha Baiswar³, Jayant Randhawa⁴, Divyant Randhawa⁵

¹Joint Replacement and Reconstruction Unit, Sir Ganga Ram Hospital, New Delhi, ²Consultant department of anaesthesia, B L Kapoor Hospital, New Delhi, ³DNB Obstetrics and Gynaecology, Sanjay Gandhi Memorial Hospital, New Delhi, ⁴B.Sc. health sciences, Trent University, Peterborough, ON Canada, ⁵Master of Medicine, National Pirogov Memorial Medical University, Vinnystya (Ukraine)

Abstract

A prospective double blind study was conducted in 200 patients for the duration of one year with the aim to study the role of low molecular weight heparin (LMWH) for deep vein thrombosis (DVT) prophylaxis in hip and knee arthroplasty patients. Routine bilateral limb venography was employed to detect the presence or absence of the thrombus in patients at the time of admission and till 12 weeks post operatively. Thrombi were detected in 40% of the patients of the control group who did not receive any prophylaxis during the post operative follow up period whereas 50% reduction of DVT was noted in patients who received LMWH prophylaxis. In this study highest incidence of DVT was seen in Bipolar hip hemi-arthroplasty (50% reduction ) and those who underwent revision knee replacement surgeries (71.4%). Lower bleeding rate of 3% in this study has been attributed to intrinsic property of LMWH. Thrombi were detected in 30% to 40% of patient form 2nd post op week onwards uptill 4th post op week , making it imperative for extended and outpatient LMWH prophylaxis.

LMWH contains in its chemical structure a unique pentasaccharide that is required for specific binding to Anti thrombin III (AT III). Their ability to catalyze the inhibition of factor Xa by AT III makes them potent antithrombotic agent used for DVT prophylaxis.

Keywords: Deep Vein Thrombosis (DVT), Hip Replacement Arthroplasty (HRA), Knee Replacement Arthroplasty (KRA)

Introduction

With the aging population on rise the total joint Arthroplasty continues to grow. Though, these procedures are life changing interventions but the release of thromboplastins from dissected soft tissue and especially reamed bone, as well as venous stasis both during surgery and during relative post operative immobility, provoke a high rate of thrombo embolism. Several measures reduce the risk of VTE, but there is always a concern about the prolonged recovery, wound failure and infection. Post operative Venous Thrombo Embolism (VTE) includes venous thrombosis (DVT) and pulmonary embolism (PE). It is a serious and life threatening complication which can be prevented to a large extent by a suitable thrombo prophylaxis ¹. To prevent this life threatening situation and the cost burden of this disease, suitable DVT prophylaxis becomes imperative ².

The incidence of imaging confirmed that asymptomatic DVT was known to vary from 42% to 57% after hip arthroplasty and 41% to 85% after knee arthroplasty. The incidence of PE varies from 0.9% to 28% after hip arthroplasty and 1.5% to 10% after knee arthroplasty (3). Clinically significant symptomatic VTE has been reported to be less common ⁴. Of the various pharmacological agents available low molecular weight

DOI Number: 10.5958/0976-5506.2019.00685.5
heparin (LMWH) prepared by physical, chemical, or enzymatic depolymerization of unfractionated heparin (UFH) has remained the cornerstone for thromboprophylaxis against DVT. Among the available LMWHs, enoxaparin and dalteparin are indicated in major orthopedic surgeries. LMWH is as effective as standard heparin or warfarin with added advantage of not requiring monitoring of activated partial thromboplastin time or international normalized ratio.

LMWH has a number of advantages over other pharmacological agents which has led to their rampant use for thromboembolic prophylaxis. However, patient selection for DVT prophylaxis can be a challenging balance between DVT risk and bleeding risk.

**Material and Method**

A prospective double blind study was conducted in total of 200 patients with a follow up duration of 12 weeks from the day of admission. Out of 200 patients, 100 received LMWH prophylaxis and remaining 100 formed control group.

In this study LMWH (Enoxaparin) 30 mg S/C once a day was advised starting from 6 to 8 hours postoperatively and continuing for 2 weeks in TKR and 4 weeks in THR. Patients were followed up by serial venogram for a duration of 12 weeks postoperatively.

LMWH preparations have varying biochemical and pharmacological properties and of the three LMWHs Enoxaparin, dalteparin and tinzaparin approved by food and drug administration (FDA) in USA for VTE prophylaxis, It is enoxaparin and dalteparin which has been approved for use in orthopaedic joint Replacement Surgery.

LMWH vary in mass from 1000 to 10000 daltons prepared by chemical or enzymatic depolymerization of unfractionated heparin. They possess pentasaccharide required for specific binding to anti thrombin III (AT III) causing thrombin inhibition. Later compared with LMWH, unfractionated heparin have proportionally more of anti factor Xa activity compared with its anti-factor II activity, the ratios of two being between 4:1 and 2:1. Pharmacokinetically, LMWH’s have a very high bioavailability, a longer half life than unfractionated heparin and much less inter individual variation in its anti coagulant reponse to a given dose. They produce less bleeding as compared to unfractionated heparin because of its different effects on platelet function and vascular permeability. The anti coagulant response (anti-Xa activity) to a fixed dose of LMWH is highly correlated with patient’s body weight. There is no requirement of laboratory monitoring of the anti coagulant response by measuring anti-X levels or dose adjustment unless pregnancy, morbid obesity or renal failure is present.

Outpatient administration of the patient with or without the assistance of a visiting nurse or family member is both possible. In 30 to 40 percent of patients treated with LMWH, along with a lower hospital re-admission, rate of VTE recurrence substantiates its cost effectiveness.

In these conditions, the Anti-xa levels are measured four hours after subcutaneous injection; the dose of LMWH should be titrated to achieve a level of 0.6 to 1.0 IU/ml if administered once daily.

In this study, routine bilateral venography was used to measure the presence or absence of venous thrombosis. Bilateral venography was first done at the time of admission to rule out any pre-existing venous thrombosis. Thereafter patient was subjected to serial venography on first post-op day, on the day of discharge i.e. the 5th post op day and at the time of suture removal i.e. the 15th post-op day. Thereafter patients were subjected to venography once in two weeks for next 12 weeks.

After 6-8 hours post-operatively, according to the guidelines issued by American Academy of orthopaedic surgeons AAOS 10 by its DVT/PE work group in 2007, LMWH (enoxaparin) was administered 12 hourly in a dose of 30mg subcutaneously. It was continued postoperatively for 2 weeks in TKR patients and 4 weeks in THR patients.

**Observation And Results**

Out of 100 arthroplasty patients who received LMWH, 50 patients (50%) underwent Hip Replacement Arthroplasty (HRA) and 50 patients (50%) underwent Knee Replacement Arthroplasty (KRA). The results and observations in this study are based on the clinical findings and data obtained from the routine venography of both lower limbs during first 12 weeks post operatively.

In the prophylaxis group (n=100), 20% patients detected for DVT (n=20), 30% patients underwent HRA.
(n=6) and 70% patient underwent KRA (n=14). Patient who underwent HRA detected for DVT (n=6), 33.3% (n=2) had undergone revision hip arthroplasty, 50% (n=3) had Bipolar and 16.7% (n=1) primary THR. However no significant difference, in DVT was seen among 11 patients who underwent primary knee replacement or revision knee replacement weather unilateral or bilateral.

3% of the patients of prophylactic group (n=3) developed bleeding complication (combined major and minor bleeding). It was 2.9% in the study by Greets et al (16). No bleeding episode was noted in any patient in the control group.

In both the groups 20% of the thrombi were detected in the non-operated leg. 30-40% of patients developed DVT 2nd post-op week onwards. In patients undergoing Hip Replacement 4% of patients of THR developed detectable thrombus between 2nd and 4th week post-operatively. Similar finding was noted in the study by planes A et al (15).

At 4 weeks post operative the incident of DVT was 8% (n=8) in patients who received prophylaxis and 26% (n=26) in patients of the control group. Of these 8 patients 82.5% (n=7) had undergone THR and only 17.5% (n=1) underwent TKR. 20% to 35% of DVT occurred after the discharge of the patients from the hospital.

In KRA patients detected for DVT (n=14), 71.4% patients (n=9) had undergone revision TKR and remaining 28.6% patients (n=5) underwent primary TKR.

40% patients (n=40) of the control group (n=100) who did not receive DVT prophylaxis revealed thrombi in their lower limb venography, whereas detectable thrombi was seen in only 20% of patients (n=20) who received LMWH prophylaxis. In this study 50% reduction in the incidence of DVT was seen after prophylaxis with LMWH. In the study by Geerts et al (16) 31% reduction in incidence was noted after DVT prophylaxis with LMWH.

**Discussion**

Incidence of postoperative DVT varies extensively in the literature not only by the ethnic differences and characteristic of population, but also by variations in diagnosis modalities such as venography, CT scan or Duplex ultrasonography, presence of symptoms, the location of thrombosis, the post operative monitoring, duration and use of mechanical preventive devices.

The clinical trials performed to date include both double blind and open label designs. If feasible, a double blind design is preferable because it provides a more valid assessment of the relative safety of LMWH (eg bleeding rate ) in comparison with other clinical approaches.

In this study as in after studies like Geerts et al (16), LMWH reduced the incidence of DVT by 50% which is quite significant (P<0.01). LMWH prophylaxis has been advised in all patients undergoing HRA and KRA as this in the most cost effective modality in preventing otherwise fatal VET and PE. LMWH has been found to be more cost effective than more complex prophylaxis with warfarin and unfractionated heparin and other prophylactic pharmacological agents (17). Parameter used for making a comparative analysis of cost effectiveness includes cost of drug, INR monitoring and cost associated with major bleeding. Feasibility of administering LMWH subcutaneously makes it possible for administering it in 30-40% of patients as outpatient therapy, thus making it very cost effective. Its cost effectiveness is further enhanced by lower hospital readmission rate for VTE recurrence as reported in study by Oster G et al (18).

In this study, Bipolar Hip Hemiarthroplasty and Revision knee Replacement surgeries carried a high incidence of DVT 50% and 71.4% respectively. High incidence of DVT in bipolar hip hemiarthroplasty has been explained in part by the fact that it corresponds to the surgery for hip fracture. Hip fracture surgery has shown greater risk for DVT than elective total hip replacement surgery (19,20). As it has been revealed in this study and also in other studies that LMWH is an effective prophylactic agent for all hip surgeries, whether elective or emergency, producing 70-80% of life threatening reduction in incidence of pulmonary embolism (PE) and venous thrombo embolism (VTE).

Lower bleeding rate in this study of 3% which is comparable with results in study by Geerts et al and in study by Hull R D et al (21) is attributed to its intrinsic safety advantage as compared with other pharmacological agents.

In this study and in other studies like Planes A et al (15), 30-40% of patient who had not received prophylaxis...
at all developed DVT around 2\textsuperscript{nd} post operative week and onwards; 26\% of HRA and 4\% of KRA developed DVT after 2 week post operatively. Henceforth, extent of duration of the DVT prophylaxis is of utter importance considering the high incidence of DVT around 2\textsuperscript{nd} post operative week and thereafter in the absence of any prophylaxis.

In this study as also, mentioned in AAOS guidelines \textsuperscript{22,23,24} the DVT risk after knee replacement is 2 week and after THR is 4 to 6 weeks thus there is a need for extended out of hospital prophylaxis in patients undergoing THR.

In this study and in study by Hull RD et al \textsuperscript{21} LMWH was started 6 to 8 hrs postoperatively which was found to be effective and safe. The thrombotic process starts as soon as the arthroplasty begins and so thromboprophylaxis must be started as close to surgery as possible\textsuperscript{19}.

**Conclusion**

The use of LMWH for DVT prophylaxis has gained popularity in past 20 years. They have a bioavailability superior to that of unfractionated heparin and other prophylactic agents and produce less bleeding for equivalent antithrombotic doses. The favourable properties of LMWH allows it to be administered subcutaneously once or twice daily without monitoring or dose adjustment in most patients. This makes it a drug of choice and the most cost effective means for extended out patient prophylaxis for DVT. Due to high incidence of DVT in patients of the control group and 70-80\% reduction in the DVT incidence after LMWH prophylaxis we conclude that LMWH should be used for prophylaxis in all Arthroplasty patients.

**Source of Funding**- Self

**Ethical Clearance**- not required

**Conflict of Interest**- Nil

**References**


molecular weight heparin. BMJ. 1991;303:543–8


Impact of Attention Deficit Disorder on Academic Performance of Children

Santosh B.R¹, Rachana N²

¹Associate Professor, School of Management, Manipal Academy of Higher Education (MAHE) Manipal, Karnataka, India, ²Research Scholar, School of Management, REVA University, Bangalore, Karnataka, India.

Abstract

Occasionally we all struggle to concentrate for a period of time, to sit still, focus on a particular activity, and have mood swings and social problems. At times we go out of control, unable to subdue our impulses. But children suffering from Attention Deficit Disorder (ADD) wrestle with these conditions every day. With the help of appropriate diagnosis and parent / teacher intervention this disorder can be out grown.

Objective: The main objective of this study is to examine the prevalent conditions and indicators of ADD in children of the age group 6-13 years and how ADD factors and traits have an impact on the academics of the students.

Method: Primary data was collected using a questionnaire distributed to parents and teachers. The data collected was analyzed using SPSS and Smart PLS.

Results: The result of the study revealed that boys are generally more affected than girls in number. Further, the result revealed that there is an inverse relationship between ADD and academic performance.

Conclusion: There is no doubt that if ADD symptoms are prevailing for a period of time one has to seek medical professional help. However, just medical attention may not be the solution to overcome ADD, teachers and parents have a significant role to play. Educating parents and teachers can lead to better parenting and teaching methods, which would improve the condition of children.

Keywords: Attention Deficit Disorder, Parents and Teachers Interventions, Academic performance, Preschool children

Introduction

Inattention deficiency is one of the typical mental ailments which develops in children at a very young age and becomes more prominent in middle school. Child with this condition have trouble staying focused on an activity, sitting still, not being able to pay attention or may lose track and not remembering to do things even after being reminded with. Having these symptoms is just the first step, and then these should persist in for a long time of about more than six months to be called as Attention Deficit Disorder (ADD). The child will not be able to complete any tasks on time as they work with very slow pace and it is very difficult for them to learn anything new. This behavior is sometime misunderstood by the parents, teachers and other elders as lack of interest of the child and is lazy to do any activities. Therefore, children will be shouted at rather than being taken care of [1]. It was found that 6 per cent of school aged face childhood learning and behavioral difficulties [2].

ADD is one of the most common disorders predominantly found among children. But there is a great amount of myths and bad assumptions about the disorder. Since many have access to internet, check symptoms on the web and come to an invalid conclusion, and live with
unsuitable treatment. Hence educating people becomes very essential also it’s necessary for them to comprehend what researches, doctors and science in actual tell about the right diagnosis and treatment for the illness. ADD is a very well documented mental disorder and is a highly treatable disease with the help of medications and therapies.

ADD can be broadly classified into:

Predominantly inattentive type of children generally suffer from poor concentration.

Predominantly hyperactive-impulsive type of children will have symptoms like interrupting, taking risks.

Combination type of children will have symptoms like difficulties staying on task and never seeming to slow down.

**Literature Review**

ADD being a mental illness, its co-occurring conditions affect the child mentally, physically and also emotionally. Most of the previous studies on ADD have focused on medical treatment to overcome the ADD syndrome. There is no doubt that if ADD symptoms are prevailing for a period of time one has to seek medical professional help. However, just medical attention may not be the solution to overcome ADD, teachers and parents have a significant role to play. Therefore, in this paper an attempt has been made to understand ADD from teachers & parents point of view and hence the subsequent literature review is narrowed down to parent teacher intervention to manage ADD child.

It is highlighted that teachers have an importance role in identifying behavioral & achievement results of children with inattention deficiency \(^3\). It is evident that teachers are the first ones to notice on the academic difficulties and failures of a child. Teacher factors do affect the behavioral and academics of the children suffering with the illness and prevalent symptoms. The effect and influence of teacher on education and health outcomes of the child and describing the factors that influence teacher’s patience, understanding and acceptability of ADD and their opinions on treatment options for their students is important. The educational research mostly reviewed two main types of compatibility issues which is among the teachers and students i.e., teacher-treatment compatibility and teacher-student compatibility. A child spends a lot of their waking hours in the classrooms, thus teacher’s viewpoint should also be considered when deciding the treatment regimes. Teachers know the illness, but not knowing how exactly to deal with the situation \(^4\). It is suggested that teachers should be more informative about the various types of treatment and therapies beneficial for a child. Teachers who exhibit patience and have knowledge of intervention techniques collaborating well with a positive attitude towards the children will result in student success.

A study on elementary school teachers has examined the impact of knowledge and misperceptions about ADD and it was founded that teacher’s awareness about both superior knowledge and misperceptions was well above chance \(^5\). Majority of the teachers know that the symptoms are not identical means to say that children with ADD do not misbehave out of willingness.

It was found that ADD was not considered as a ‘real’ disease but rather a combination of behaviors which the parents and teachers have become unwilling to tolerate and handle \(^6\). By the inference of this study on children critics claim that the Attention Deficit Disorder is either over diagnosed and as a result receive inappropriate treatment. Also only half the number diagnosed undertakes medicine and therapy. A certain percent of parents consider it to be a medical problem, but are more likely to believe that excess of sugar content in the diet of the child leads to ADD. Though many of the respondents have heard of ADD but could not be able to describe anything about it. This clearly shows the lack of awareness and knowledge about the disorder and how to deal with it.

Studies have revealed that ADD is associated with social difficulties, academic under achievements, mental co morbidities and peer problems \(^7, 8\). Functional deficits emerge into the children with ADD over a period of time but very little is known. It is reported that children with ADD had lower reading, spelling and math scores and low IQ scores when compared to normal children. Girls have been less likely to have been diagnosed than boys.

It’s argued that the peer relationship affect with children suffering from ADD and how ADD initially contributes to the problematic relationships also the reaction of peer’s to such issues and troublesome situation \(^9\). A peer group is both a social and a primary group of people which they prefer talking to. It is noticed
that observational learning fails in children suffering from ADD. Prior studies and research designate children with ADD experience peer rejection. It is well treated by stimulant medication, social skill training and behavioral contingency management. Short term interventions are not enough to help overcome the peer problems, hence typically require long term treatment. Individuals with ADD have found it difficult to organise tasks and materials, facing difficulty estimating time and prioritising their work and have trouble getting started on work. They tend to lose focus and attention while trying to listen or plan and is easily distracted by internal or external factors and forgets what was read and needs to re-read. They have trouble regulating their sleep, quickly loses interest in task, and finds it difficult to complete task on time. They have trouble controlling emotions and find it difficult to manage frustration. They find it hard remembering to remember and the child is not able to recollect recent happening while he is able to remember things of the past. And finally, he also speaks about ADD child finds it hard to control actions, to monitor and modify own actions to fit situation/aims and are too impulsive in what they think, do and say, jumping too quickly to incorrect conclusions [9].

Therefore from the above literature review it’s identified that common symptoms in ADD child is being organized, focus, effort, emotion, memory and impulsive.

**Objectives**

To determine the prevalence of ADD symptoms in children of the age group 6-12 years.

To identify the gender difference in the prevalence of ADD symptoms.

To determine the impact of ADD dimensions on academics.

**Methodology**

To achieve the objectives of the research study, the primary data was collected through structured questionnaire. The survey in confined to primary school children of Bangalore in the age group 6-13 years. In total 300 parents where contacted and out of which 88 parents agreed to participate in the survey. The parents were asked about their child behavior. Same questionnaire was given to both parents and teachers and an average was taken of their responses. Sampling technique used for the study was simple random technique. To test the hypothesis, the researcher adopted a modified version of Brown ADD rating scale questions and the data was analyzed using SPSS and PLS.

**Data Analysis**

**Objective One:** Prevalence of ADD symptoms in children of the age group 6-13

**Table 1: Means and Standard deviation of the study variables**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unorganized</td>
<td>2.93</td>
<td>0.73</td>
</tr>
<tr>
<td>Lack focus</td>
<td>2.83</td>
<td>0.90</td>
</tr>
<tr>
<td>Lack of Effort</td>
<td>3.09</td>
<td>0.92</td>
</tr>
<tr>
<td>Emotion instability</td>
<td>2.87</td>
<td>0.61</td>
</tr>
<tr>
<td>Lack Memory</td>
<td>3.10</td>
<td>0.97</td>
</tr>
<tr>
<td>Impulsive</td>
<td>2.97</td>
<td>0.97</td>
</tr>
<tr>
<td>Academic performance</td>
<td>2.782</td>
<td>0.83</td>
</tr>
</tbody>
</table>

**Objective Two:** To identify the gender difference in the prevalence of ADD symptoms.

**Table 2: Gender difference of ADD symptoms**

<table>
<thead>
<tr>
<th>ADD sub type</th>
<th>Male</th>
<th>Percentage</th>
<th>Female</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD</td>
<td>52</td>
<td>59</td>
<td>35</td>
<td>41</td>
</tr>
<tr>
<td>Unorganized</td>
<td>48</td>
<td>56</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>Lack focus</td>
<td>50</td>
<td>58</td>
<td>36</td>
<td>42</td>
</tr>
<tr>
<td>Lack effort</td>
<td>53</td>
<td>62</td>
<td>33</td>
<td>38</td>
</tr>
<tr>
<td>Emotion instability</td>
<td>44</td>
<td>51</td>
<td>42</td>
<td>49</td>
</tr>
<tr>
<td>Lack Memory</td>
<td>50</td>
<td>58</td>
<td>36</td>
<td>42</td>
</tr>
<tr>
<td>Impulsive</td>
<td>47</td>
<td>55</td>
<td>39</td>
<td>45</td>
</tr>
</tbody>
</table>

**Objective Three:** To find out if academics is influenced by ADD dimensions
Table 3: Relationship between sub-constructs of ADD on academics

<table>
<thead>
<tr>
<th></th>
<th>Academic performance</th>
<th>Unorganized</th>
<th>Lack focus</th>
<th>Lack effort</th>
<th>Emotion instability</th>
<th>Memory loss</th>
<th>Impulsive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic performance</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unorganized</td>
<td>-0.381</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack focus</td>
<td>-0.557</td>
<td>0.332**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack effort</td>
<td>-0.532</td>
<td>0.342**</td>
<td>0.379**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotion instability</td>
<td>-0.387</td>
<td>0.358</td>
<td>0.191</td>
<td>0.318**</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack Memory</td>
<td>-0.538</td>
<td>0.368**</td>
<td>0.469**</td>
<td>0.464**</td>
<td>0.272**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Impulsive</td>
<td>-0.599</td>
<td>0.288**</td>
<td>0.631**</td>
<td>0.275*</td>
<td>0.260**</td>
<td>0.577**</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 4: Findings from Smart-PLS

<table>
<thead>
<tr>
<th>Factors</th>
<th>Hypothesis</th>
<th>Beta</th>
<th>t-value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADD-Impact on Academics</td>
<td>H₁</td>
<td>-0.730</td>
<td>14.134</td>
<td>Significant</td>
</tr>
<tr>
<td>Unorganized</td>
<td>H₂</td>
<td>0.198</td>
<td>3.901</td>
<td>Significant</td>
</tr>
<tr>
<td>Lack focus</td>
<td>H₃</td>
<td>0.262</td>
<td>5.800</td>
<td>Significant</td>
</tr>
<tr>
<td>Lack effort</td>
<td>H₄</td>
<td>0.166</td>
<td>4.231</td>
<td>Significant</td>
</tr>
<tr>
<td>Emotion instability</td>
<td>H₅</td>
<td>0.229</td>
<td>4.754</td>
<td>Significant</td>
</tr>
<tr>
<td>Lack memory</td>
<td>H₆</td>
<td>0.179</td>
<td>3.563</td>
<td>Significant</td>
</tr>
<tr>
<td>Impulsive</td>
<td>H₇</td>
<td>0.318</td>
<td>4.629</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Analysis of Results and Discussion

Table 1 provides the mean and standard deviations between variables. In general, and considering all of the dimensions, memory and effort had the highest mean score of the constructs studied. Likewise, from table 2 it is inferred that boys show more symptoms of Attention Deficit Disorder when compared to girls.

From Table 3 reveals the correlation between study variables and academic performance. The result reveal inverse relationship between ADD and academic performance indicating if the ADD increases the academic performance decreases. Other sub constructs of ADD was positively correlated with ADD dimension with p<0.05.

Table 4 presents the findings form Smart PLS, where beta values are the coefficients of regression and t-values are used to decide on the significance. Expectedly, t-value with greater value of regression coefficients is found higher. Following the rule of thumb, t-value greater than two (t>2) is considered as significant, and is used for making decisions on the constructed hypothesis.
Table 4 provided the β value and t-value. The β value for the path ADD and academic performance was negative indicating inverse relations with t-value of 14.134, therefore $H_1$ is supported. The results comply with the earlier findings \[10\]. This implies that there is a significant impact of attention deficit disorder on academics. A child who shows a pattern of ADD symptoms may often fail to pay close attention to details or make careless mistakes in schoolwork, have difficulty following through on instructions and fail to finish schoolwork.

The result from PLS analysis revealed that t-value for the path being unorganized and its impact on attention deficit disorder was 3.901, hence $H_2$ is supported. This result are in tune with earlier findings \[11\]. A child with this symptoms shows a pattern of trouble organizing tasks and activities, loses items needed for tasks or activities, have trouble getting started with work.

The result from PLS analysis revealed that t-value for the path focus and its impact on attention deficit disorder was 5.800, hence $H_3$ is supported. This result are in tune with earlier findings \[12\]. This implies that a child will face hard time sustaining focused attention on a task having trouble to concentrate, easily distracted, appear not to listen even when spoken to directly.

The result from PLS analysis revealed that t-value for the path effort and its impact on attention deficit disorder is 4.231, hence, $H_4$ is accepted. The results are in line with American Psychiatric Association. This implies that the child finds it hard to control actions and is very impulsive.

**Conclusion**

In this paper an attempt is made to understand teacher and parent interventions on children with ADD. Nurturing a child with ADD is a challenging task. An ADD child may make carless mistakes, may have difficulty to follow instructions, trouble to concentrate, may be emotionally week, and can be very impulsive in such scenarios it’s important for both the teacher as well as parent to have patience, tolerance, persistence and personal belief to nurture an ADD child. Both the teacher and the parent must not react negatively to children acting out, because it can lead to children feeling embarrassed and socially isolated. Teachers and parents have daily interactions with the ADD students. They have access to the behavior patterns of the children on daily basis and they can monitor and record the observation this in turn will facilitate a better understanding and create a better awareness of the child’s requirements enhancing interpersonal relation and academic performance.

**Conflict of Interest**: Nil

**Source of Funding**: Self

**Ethical Clearance**: Taken from PTC committee

**References**


Dental Educational Environment in Institutions of South East Asia

Ramprasad Vasthare¹, Swagata Saha²

¹Associate Professor, ²Dental Intern, Dept. of Public Health Dentistry, Manipal College of Dental Sciences, Manipal, Manipal Academy of Higher Education, Udupi district, Karnataka, India

Abstract

Background and Objective: To improve the level of satisfaction of the student from the environment of learning is one of the important challenges faced by dental educators today. It has been hypothesized that since the learning styles of students are extremely varied, adopting methods of imparting dental education that suit their style will result in improved learning. The aim of this study is to effectively gain information about the learning style preferences amongst the dental students in the institutions of South East Asia.

Method and Results: A list of dental schools in the region was made from the World Dental School list. An internet based search was done to identify the infrastructural facilities from the website or via email. Scores were allotted for each learning style preference and the results were tabulated and analysed.

Conclusion: If adequate consideration is given to all parameters that affect dental educational environment, dental institutions will have a positive impact and will make dental learning, a more rewarding and pleasant experience.

Keywords: dental students, dental education, curriculum, learning styles

Introduction

South East Asia, a part of Asia consists of 11 countries namely Cambodia, Brunei, East Timor, Laos, Indonesia, Malaysia, Philippines, Myanmar, Singapore, Thailand and Vietnam and 4 territories namely Cocos Islands, Andaman and Nicobar Islands, Christmas Islands, and Hainan. It has a population of 610,000,000 and has around 65 Dental Institutions.

The dental education at undergraduate and post graduate levels is largely specialty oriented and the requirement of the system is apt infrastructure, healthy learning environment and dedicated training from well qualified instructors. It is well known that each student has his or her preferred way of learning and most students take elements of different styles to see what suits them in order to assimilate new information.

It has been hypothesized that since the learning styles of different students can be extremely varied, adaptation of methods of imparting dental education to suit their style will result in improved learning. [1]

A number of studies have been identified the stress sources that come along the different stages of one’s dental career. The key strategy in improving the overall quality of dental school environment is to identify the catalysts responsible for the stressors.[2]

Since not much information was available on the dental educational environment support systems in the countries of South East Asia, an internet based study was planned.
Objectives

The objectives of this internet based study was to:

Assess the existing dental educational environment in the countries of South East Asia.

Assess whether the Dental Educational Environment is supportive of different styles of student learning preferences namely Visual, Read/Write, Aural (Auditory) and Kinaesthetic.

Review of Literature

According to Bertolami [3], one of the major points of exasperation among students with the syllabus is the discrepancy between content to be learnt and the form of delivery of the very same.

Although a sizeable amount of dental students prefer a myriad learning styles, the faculty of dentistry teach extensively via lectures. Lecturing is critically a passive learning method that only encourages note taking in class rooms and in turn rote memorization as a means to accumulate knowledge [3].


Visual: These learners have a preference to use diagrammatic representations and symbolic illustrations like flow charts, graphs, models, hierarchies and arrows to understand the printed information. They may themselves use diagram or a picture to explain a concept to someone else.

Aural: These learners prefer listening rather than taking notes. To help with their understanding, they may say aloud their answers or hear taped discussions about the same.

Read/ Write: The students in this category learn better through printed words and text. They like studying from glossaries, lists, prescribed course books, notes made in lectures and handouts.

Kinaesthetic: Although put as a separate subpart, kinaesthetic learning is a combination of sensory capabilities. Experience and practice result in learning. In this type of practice, the student has to live or feel the experience in order to learn from it. In dentistry, this type of learning is received through clinical instruction or preclinical laboratory simulation.

The objective of instruments like VARK as stated by Fleming is to act like a catalyst for conversation between students and instructors. These methods are easy to understand and use and may help establish self-awareness amongst students in their endeavour to find the best technique to improve understanding.

There are two critical transitional periods in the life of a dental student i.e. freshman year (first year), when they are make the transition from the undergraduate level to professional school, and during the junior year (third year ), when they move from the classroom to clinical environments and start patient care. The students’ perception at these two levels were measured with the Dental Student Learning Environment Survey (DSLES).

Following are the different scales used in DLES:

FLEXIBILITY: It involves the extent of opportunities for students and faculty to change the environment for learning and the control over students. For example: Students are given the option to formulate their curriculum as per their preferences.

STUDENT TO STUDENT INTERACTION: The ability of students to mix socially and academically with students of different years and of the same year. For example, students in a dental school know each other well.

EMOTIONAL CLIMATE: It is about how a student’s experience affects their non-intellectual (affective) perceptions. Student’s anxiety hindering them from reaching up to their full potential is an example.

SUPPORTIVENESS: It talks about the extent the staff supports and encourages the students. For example, the school takes an active interest in the well-being of its students.

MEANINGFUL EXPERIENCE: The degree to which structured learning activities are up to date with the current practice of dentistry. For example if a student feels that the educational experience at dental school is a sense of achievement then it is a meaningful experience.

ORGANISATION: It is about the level of overall cohesion and coherence of learning experiences set within the curriculum. For example, classes progressing
systematically from week to week is a type of organisation.

**BREADTH OF INTEREST:** It explains about the encouragement given by dental schools to its students to conduct extra-curricular activities outside of regular coursework. Faculty promoting student interest in oral health care in a broad social context is an apt example.

There are a number of other “Learning Environment Assessment Instruments” namely:

- Clinical Learning Environment Inventory ( CLEI )
- Clinical Post Conference Environment Survey ( CPCLES )
- Clinical Education Instructional Quality Questionnaire ( CLIN Ed IQ )
- Dundee Ready Educational Environment Measure ( DREEM )
- State Self Esteem Scale. (SSES)
- Curriculum Strengths Weaknesses, Opportunities, and Threats (C-SWOT) survey.

Various innovative concepts have been put forth in dental education some of which are based on Independent study like individual or group research project which may not require a written examination. Other modules include:

- Problem based Learning
- Human Resources Management Course
- Undergraduate Research Opportunities Programme ( UROP )
- Student Exchange Programme
- General Practice Management Course.
- Student Teacher Guardian Schemes
- Faculty Student Partnership Practice model

**Materials and Methods:**

The list of dental schools in each country and territory in South East Asia as available was recorded from the list of World Dental Schools. The internet was used effectively to gain information about the infrastructural facilities in the dental school as per the websites of the school or information via email. If there were more than 5 dental schools in a country, the year of establishment of the dental school and the annual intake of students were used as a criteria to limit the study to the top 5 dental schools from each country. Information regarding the support systems for the students was systematically collected.

Since learning is individualistic and learning style preferences can vary, the learning style preferences were classified as per VARK instrument i.e.

- Visual
- Aural
- Read/Write
- Kinaesthetic

Visual style was checked by the availability and use of 5 features:

- 3 Dimensional Anatomy Software
- Internet sites with videos and demonstrations
- Digital media in teaching
- Instructional videos, movies and the use of television for teaching
- Powerpoint presentations

The Aural (Auditory) style of learning preference was checked via the availability of following 3 features:

- Audio visual tools
- Audiobooks
- Commentaries/ Narratives/ Interviews

The Read/ Write style of learning preference was checked via the availability of following 5 features:

- Self-study and Group study area
- Availability of Reading Rooms
- Availability of a good library facility
- Writing down notes and points regularly in teaching
sessions

Assignments, written tests and written examination practices.

The Kinaesthetic style of learning preference was checked via the availability of following 2 features:

Pre-Clinical simulation laboratories
Models and Gadgets for hands on training

1 point was allotted if a dental school in a given country had a particular feature and 0 point was allotted if the said feature was absent in a dental school of a given country.

When the data was being organised country wise, the dental school with the highest score for each component of the 4 learning style preferences was selected. It was considered as a representation of the availability of a particular style of learning preference in a given country.

An internet based search of the related facilities with respect to VARK instrument available in the top 5 dental schools of each country was done. The data so processed was recorded and interpreted.

Results

Table 1: Depicts the South-East Asian Countries with the corresponding styles of student learning preferences.

<table>
<thead>
<tr>
<th>Country</th>
<th>Visual score obtained</th>
<th>Visual maximum score</th>
<th>Read/Write score obtained</th>
<th>Read/Write maximum score</th>
<th>Aural (auditory) score obtained</th>
<th>Aural maximum score</th>
<th>Kinesthetic score obtained</th>
<th>Kinesthetic maximum score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Thailand</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Malaysia</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Philippines</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Vietnam</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Laos</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Myanmar</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 1: The above data shows the score in percentage with respect to the different learning styles in the individual South East Asian countries.

From the data above it can be inferred that Singapore and Thailand have a good combination of the different styles with a score of 12 out of 15. They are followed by Malaysia, Indonesia and Vietnam with a score of 11 out of 15. Cambodia and Laos have the lowest scores in the area which indicates that the dental schools are equipped with limited infrastructure and the students are not exposed to the different learning style preferences.

Singapore, Malaysia and Vietnam have the highest scores in the Visual learning preference while Cambodia has the lowest score.

Coming to Read/write learning preference, Singapore and Thailand have the best infrastructure to support the same while Cambodia has the least.

With respect to Aural learning preference, Laos has limited support system in this category compared to the other countries as it has 1 point short of others.

Thailand and Indonesia has the highest scores in the category of Kinaesthetic which indicates that the dental schools in these countries encourage the use of
simulation laboratories and hands on training on models compared to the other countries in the region.

**Conclusion**

Student preferences should be addressed by dental educators so that the students are taught in learning conducive environments.

Dental education may be split into visual, read/write, aural and kinaesthetic modalities and is best imparted by interchanging amongst all of them. Students should be given the opportunity to observe and assist before they start their clinical years in the dental school to help in a smoother transition to the clinical aspect of dentistry setup and improve their interaction with the patients. Senior students who mentor the juniors provide an important experience for both of them. It could pave the way for a career in academic dentistry. The chance to shadow faculty and better experienced students, after entering the clinical years is an extremely important but underexploited technique for strengthening the clinical acumen of students.

Application of simulation technologies as a substitute for some aspects of teaching procedural steps hold huge promise and if utilized correctly can completely renovate the methodologies of imparting dental education to the future torch bearers of our profession.

Using high resolution videos to impart teaching helps to free the time of the instructor who can then give more personal training to the trainee, though it will never substitute for direct forms of teaching the clinical procedures.

The learning preferences of dental students for instructors who promote visual presentations and encourage note taking during lectures, is duly noted, but there is a small yet notable amount of students who actually prefer learning by listening or indulging in activities. While the majority comprise of aural learners who prefer lectures, a dialogue, discussion or case study further improves on the much needed learning and retention skills.

Active participation or more opportunities to do so in lectures and preclinical demonstrations definitely appeals to the kinaesthetic learner and pushes them to do better and improve their grasp and understanding of the subjects.

Students may or may not undergo a shift in their preference of learning when they change their learning environment from the lecture halls to preclinical laboratories and finally to the dental clinic. Educators need to be made aware of the differences in order to gratify or at least consider the likelihood of bettering the chances for aural and kinaesthetic learners.

Academicians are also supposed to acknowledge that many students prefer self-directed learning, indicating a desire for more instructions in the more incorporative, electronic form of media. They may mistake poor attendance in lectures as an absence of interest in the subject or even worse, as disrespect.

Faculty should be able to control their feelings by actually trying to understand as to why students want to learn in different ways. A simple gesture like asking “How would you like me to teach you?” will lead to a meaningful debate in a healthy manner of new ways to make learning more easy.

The VARK approach makes the dental educational experience both more productive and enjoyable for students and faculty members.

Further focusing on the below adds value:

- Creating problem centred curricula that will help students bridge the preclinical sciences to patient care.
- Using informational technologies to improve “Anytime, Anywhere” accessibility to a knowledge database and stimulate their learning experience.
- Implementing thematically integrated curricula conducted by interdisciplinary teams.
- Incorporating evidence based learning into the student’s curricula and patient care in clinics.

If adequate consideration is given to all parameters that affect dental educational environment, dental institutions will have a positive impact making dental learning, a more rewarding and pleasant experience.

**Limitations of the study:**

Updating of some websites had not been done. Some of the data available was outdated. Some institutions did not respond to the sent email.
Sometimes specific information in relation to some dental schools was not available on the website and after their email response, created bias in judgement. Such information had to be excluded.

Internet data can be suggestive, but cannot replace a personal interaction, stay or personal experience on a one to one basis.

When there were more than 5 dental schools in a given country, the chances of a country showing a higher score was possible due to reasons of representation.

Recommendations:

Dental Institutions should try and provide student learning opportunities that cater to all preferences of student learning styles namely Visual, Aural, Read/Write and Kinaesthetic.

Reorientation of the data available on the institution’s websites highlighting the facilities available, should be aligned with the student learning preference styles, so that the student using the website for information can judge whether a particular institution will suit him or her according to his or her learning preference style.

Conflict of Interest: Nil

Source of Funding : Self funded

Ethical Clearance: Not indicated

References


Understanding Relationship between Internet Addiction and Emotional Intelligence with Reference to Delhi-NCR Region

Verma Priti¹, Arora Nidhi²
¹Assistant Professor, Department of General Management, Sharda University, Greater Noida, ²Director, Dr. Ambedkar Institute of Management Studies, Bangalore, Karnataka

Abstract

Internet has brought a paradigm shift in almost all the vital aspects of life and has become an integral part of our life and society. Although numerous positive aspects of the Internet cannot be ignored; its excessive and pathological use and resulting health hazards have also drawn attention of researchers. The young generation is worst affected by it. The uncontrolled addiction to and obsession with internet leads to various psychological problems and affects mental health which is closely associated with emotional intelligence. Emotional Intelligence helps create a positive work climate, as it is closely linked with the interpersonal relationships, group dynamics and professional, leadership & managerial effectiveness. Thus, negative affect of internet addiction on Emotional Intelligence may be a big Public Health issue. There is, therefore, a dire need to understand the relationship between internet addiction and emotional intelligence. The present research aims at investigation of relationship between internet addiction and emotional intelligence based on a survey conducted on 1200 Students of various colleges in Delhi-NCR region. The study can be helpful in creating awareness and inspiring active research and thinking to find solutions to reduce the damaging effect of internet addiction on emotional intelligence.

Keywords: Internet addiction, Emotional Intelligence, Mental disorder, Relations, performance.

Introduction

Today, internet has brought a paradigm shift in almost all the vital aspects of life; and has become an integral part of our life and society. Although numerous positive aspects of the internet cannot be ignored; and are readily appreciated, its excessive and pathological use has also drawn attention of researchers. The new generation, highly exposed to internet uses, is likely to face the severe danger to different psychosocial problems.

Presently, all over world, a very large percentage of young generation has access to the Internet and they spend a considerable part of their time on online activities.

Corresponding Author:
Dr Priti Verma,
Assistant Professor, Department of General Management, Sharda University, Greater Noida.
Email: priti.verma@sharda.ac.in

After research on young generation’s uncontrolled addiction to and obsession with internet, researchers have concluded that the use of internet can bring negative consequences on the psychological welfare of users. Nima & Nazarin discovered a positive and significant correlation between anxiety level and internet addiction. It is a matter of serious concern, as internet addiction can result in the individual’s isolation from family and society, resulting in mental and behavioral disorders. Certain side effects pointed out by researchers are anxiety, stress and depression. These are related to mental disorder which affects emotional intelligence; which finally affects performance. Thus, this is a grave public health issue and needs to be researched.

Emotional intelligence is related to mental ability and activity and enhances individual and organizational performance by playing a significant role in understanding and maintaining the relationships with people. The well managed emotional intelligence can build an effective working environment anywhere, be it family or
educational institution or workplace. It is an important key to manage oneself as well as one’s relationship with others; and is thus entwined with social skills. Referring to human relations, success depends on recognition and awareness of our emotions, our emotional reactions, our understanding of others’ emotions and our strategic handling of different situations through emotional intelligence. Effective emotional intelligence helps in maintaining the quality of relations between individuals and thereby creating a positive environment.

There is, therefore, a dire need to understand the relationship between internet addiction and emotional intelligence, as emotional intelligence is closely linked with the interpersonal relationships, group dynamics and professional, leadership & managerial effectiveness. Today, with the prevalence of digitalization in every walk of life, where to cope with the aftermaths of the internet addiction has become a grave concern, the study can be helpful in creating awareness and inspiring active research and thinking to find solutions to reduce the damaging effect of internet addiction on emotional intelligence.

Although some researchers have conducted research on the topic and have discovered a positive relationship between internet addiction, emotional intelligence and students at different levels and employees, yet these studies are related to specific geographic regions. The present research aims at investigation of relationship between internet addiction and emotional intelligence among students in Delhi-NCR region.

### Literature Review

Internet addiction also termed as virtual addiction, can be defined as disproportionate and unrestrained preoccupations with Internet use resulting in distress. Internet addiction is the disorder caused by unreasoning and uncontrolled use of internet. It may negatively affect the individual’s mental and emotional health. Douglas et al. define it as a kind of extreme compulsive use that if the person is deprived, he gets too irritable and bad tempered.\(^6\)

Rickert advanced the view that excessive use of the Internet may lead to Internet Addiction Disorder, which includes problems with daily routines, school performance, and family relationships.\(^7\) Internet addiction is defined as an individual’s inability to control his or her use of the internet, which eventually causes psychological, social, school, and/or work difficulties in a person’s life.\(^8\)

Like any other addiction, internet addiction also results in several problems like little sleep, long gap between two meals, and inadequate physical activity. It also disturbs the studies and other aspects of the daily life of an individual.\(^9\) All of these result in a reduction in social communications and an increase in loneliness and depression.

Emotional intelligence comprises knowing one’s emotions, managing emotions, motivating one, recognizing emotions in others, and handling relationships.\(^10\) Emotional intelligence also refers to true understanding of the self-motivation, environment, recognition and controlling of one’s own feeling & those of others.\(^11\)

Emotional intelligence is the ability to know one’s own emotions and of others. It also includes emotion regulation in social situation.

Salovey and Mayer introduced the term emotional intelligence as the way in which an individual processes information about emotion and emotional responses. They identified emotional intelligence as the “ability to monitor one’s own and other’s feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and action.”\(^12\) It is emotional ability of a person that helps him/her reach self-awareness-based self-control.\(^13\)

The model of emotional intelligence given by Daniel Goleman says that a person’s set of skills powered by the brain dynamics in the background relate to one’s reactions. According to him emotional intelligence can be divided into two groups: the ability to manage ourselves as individuals, and to understand others, which in turn, is responsible for managing our social skills. The emotional part of the brain perceives the world differently than the reasonable part. Some skills like analytical thinking and technical skills are cognitive; some are a sort of blend of cognition and emotion, known as emotional intelligence.\(^14\)

Emotional intelligence consists of four fundamental capabilities: self-awareness, self-management, social awareness, and social skill. Each capability, in turn, is composed of specific sets of competencies.\(^15\)
In Sweden, Engelberg and Sjoberg conducted a study on 41 university students and used MSCEIT to assess internet addiction. They observed that those who scored high on the internet addiction scale performed poorly in emotion-decoding task.\(^{[16]}\)

The people, addicted to internet face not only physical side effects like back pain, neck stress, eye strain, but may also experiences academic, family and social problems.\(^{[17]}\)

Internet addiction may also lead to anxiety, depression and stress. There exists a positive and significant correlation between the level of anxiety and internet addiction.\(^{[18]}\)

Another very important ramification of internet addiction is increasing cut-off of human being from human being in society. Growing internet obsession is resulting in the avoidance of face to face social interactions.\(^{[19]}\)

Thus, Internet addiction affects social interaction and relation as well. It is making people more and more introvert as they are getting more absorbed in the internet and virtual world and are moving away from family and society.\(^{[20]}\) This virtual Social networking can be potentially harmful to the people.

Hasan Khoshakhlagh et.al., studied the relationship of Emotional Intelligence and Mental Disorders with Internet Addiction, in Internet Users University Students. The research was related to students from Isfahan University, Iran. The results showed a correlation between emotional intelligence and mental disorders with internet addiction.\(^{[21]}\)

**Methodology**

**Sample Design**

A sample of 1200 students falling in the age group of 17-24 years was chosen using convenient sampling from Delhi – NCR Region, India.

**Assessment tools**

1. Dr. Kimberly Young’s Internet Addiction Test.

**Results and Discussions**

**Table 1: Correlation between Age, Gender, Education, Family Income Internet Addiction & Emotional Intelligence**

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Gender</th>
<th>Education</th>
<th>Family Income</th>
<th>Internet Addiction</th>
<th>Emotional Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>-0.05904</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>0.122688</td>
<td>-0.04037</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Income</td>
<td>0.046871</td>
<td>0.005194</td>
<td>0.012421</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet Addiction</td>
<td>-0.03705</td>
<td>-0.01292</td>
<td>-0.00884</td>
<td>0.030787</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Emotional Intelligence</td>
<td>0.035873</td>
<td>-0.02403</td>
<td>0.077189</td>
<td>0.054711</td>
<td>-0.05352</td>
<td>1</td>
</tr>
</tbody>
</table>

Internet Addiction is positively correlated to Family Income and negatively correlated to Gender, Age, Education, whereas Emotional Intelligence is positively in correlation with Age, Education & Family Income, and negatively correlated to Gender & Internet addiction.
Considering Internet addiction & Emotional Intelligence as the variables, it can be observed that the correlation coefficient is 0.053519, there exists a positive relationship. Coefficient of determination is 2%, the standard deviation of error is 5.285, samples observed were 1200.

Table 3: Lower Bound & Upper Bound of Intercept, Internet Addiction

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t Stat</th>
<th>P-value</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
<th>Lower 95.0%</th>
<th>Upper 95.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>49.36163</td>
<td>0.814465</td>
<td>60.60621</td>
<td>0</td>
<td>47.76369</td>
<td>50.95956</td>
<td>50.95956</td>
</tr>
<tr>
<td>Internet Addiction</td>
<td>-0.0242</td>
<td>0.013048</td>
<td>-1.85506</td>
<td>0.063833</td>
<td>0.0498</td>
<td>0.001395</td>
<td>0.001395</td>
</tr>
</tbody>
</table>

Table 4: Anova Test Summary

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value</th>
<th>F crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>108366.7</td>
<td>1</td>
<td>108366.7</td>
<td>1314.495</td>
<td>7E-230</td>
<td>3.845339</td>
</tr>
<tr>
<td>Within Groups</td>
<td>197690.7</td>
<td>2398</td>
<td>82.43981</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>306057.4</td>
<td>2399</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Anova Test Group Summary

<table>
<thead>
<tr>
<th>Groups</th>
<th>Count</th>
<th>Sum</th>
<th>Average</th>
<th>Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Addiction</td>
<td>1200</td>
<td>73580</td>
<td>61.3167</td>
<td>136.8821</td>
</tr>
<tr>
<td>Emotional Intelligence</td>
<td>1200</td>
<td>57453</td>
<td>47.8775</td>
<td>27.99749</td>
</tr>
</tbody>
</table>
Statement 1: A Study of Relationship between Internet Addiction and Emotional Intelligence of Students.

Null Hypothesis $H_0$: There is no significant relationship between Internet Addiction and Emotional Intelligence of Students.

Alternate Hypothesis $H_1$: There exists significant relationship between Internet Addiction and Emotional Intelligence of Students. It can be observed from Table 4 that the value of $F$ is 1314.459 and $F$ Critical value is 3.845.

$F > F$ Critical, We reject the Null Hypothesis and accept the alternate Hypothesis.

Conclusion

Thus, from the Results, it can be understood that there exists an influence of Internet Addiction on Emotional Intelligence. Therefore, for the well-being of current generation and posterity, and for the overall future growth; it needs attention of the researchers from interdisciplinary as well as multidisciplinary Area. It is essential to take preventive measures to avoid damaging effect of internet on people and society.

Conflict of Interest: Not applicable. This is a literature review and random sampling data analysis-based paper.

Source of Funding: Self.

Ethical Clearance: For this only questionnaire-based data was collected. Questionnaires were willingly filled by the candidates. Out of 1300 Questionnaires, 1200 questionnaires were properly filled.

No other experiment was done on any one. Hence, it does not require Ethical Clearance.

References

16. Engelberg, E., Sjoberg, L. Internet use, social


21. Hasan Khoshakhlagh et.al. In the paper titled “The Relationship of Emotional Intelligence and Mental Disorders with Internet Addiction in Internet Users University Students”, ResearchGate, April 2012.
A Study on Occupational Stress of Assistant Professors in Selected Private Universities – Chennai

P. Abinaya¹, S Indupriya²
¹Research Scholar; ²Assistant Professor; Department of Commerce, VISTAS, Pallavaram, Chennai

Abstract

Today’s fastest, highly populated and polluted world, Stress is a common issue which plays a major role in humans life. Each and everybody are facing Stress due to various reasons. It is a mental strain which promotes various disorders. The present study examines the level of stress among Assistant Professor working in Private Universities and providing few suggestions to overcome from it. Sample includes 60 faculties drawn from four Private Universities in Chennai using simple random sampling method. Primary data were collected using a structured questionnaire and were analysed using mean, t-test and chi-square test. The level of stress factors was determined in a sequence. Further, among demographic information of respondents, the results revealed that there is a significant relationship between socio-economic and demographic variables of the respondents Such as Designation, Gender, Age, Marital Status, and Experience with the level of stress factors. The present study also focuses on suggesting some techniques to reduce the level of Stress by following ways like yoga, breathing exercises, meditation, Listening music, reading stories and novels etc.

Keywords: Stress, Stress Management, Psychological problem, Work burden, Techniques

Introduction

Nowadays a stress has become an internal part of jobs in every sector. Everyone lives is engaged with some stress due to internal and external element. External elements like job related stress, family oriented, Behavioural related stress etc. on the other hand internal elements like feel insecurity, inferiority, and ill-health, unrealistic expectation etc. The stress also creates emotional and psychological problem to all kind of people. Emotional signs are anger, anxiety, forgiveness, sleep disruptions, weight fluctuation, changes in eating habit, irritating. Psychological problems are head ache, blood pressure, stomach problems, hypertension, heart attack etc. The positive stress helps improved productivity & force people to focus sharply and the positive stressed people have to know how handle and overcome from the problem. But if the stress is growing negatively is very dangerous because the stress may cause some incurable diseases like cancer, tumour etc.

In every field a person have to come across stress due to life changing, human tendency and environmental changes. This paper focuses on the study about stress among Assistant professors working in private universities in Chennai. Most of them, they considered that this profession is least stress profession. Although the Assistant professor jobs includes more workload due to student colleagues relationship, Resources Availability, Meetings and professional activities, Management involvement, Regulation of government etc. Nowadays the professor career carries huge amount of stress. They have to handle the young generation (student), have to obey the orders and complete the entire work given by management and most importantly they have to update themselves to current scenarios.

Review of Literature

Reddy K. Jayasankara & Mr. Karishmarajamenon (2018) studied on “Academic Stress and its Sources Among University Students” defines the stress is the integrated part of students academic life. In his paper clearly discuss about the cause of stress in different dimensions like personal inadequacy, fear of failure, interpersonal difficulties, teacher pupil relationships etc. The author analysis data in to two categories are 1. Gender wise, 2. Steam wise. The study employed a quantitative research design. To understanding the source from the different spheres will enables professional in the field.
to tailor-maker intervention for students combining the most effective strategies.

Dr. Ravi and R. Kadhirvel (2016) conducted “A Study on Stress Management of School Teachers with Special Reference to Erode District” in his paper clearly study about, how the school teachers are affected due to stress and this paper also reveals some suggestions to overcome the stress by doing yoga, meditation, exercise, listening music, counselling from counsellors etc. The author used only average and percentage analysis to interpret the result. Finally this paper concludes how to manage people at work differently treating them with respect and valuing their contribution.

D. Selliah and S. Fabiyola Kavitha (2015) in their paper to study about “A Study on Stress Management with References of Softorix Technologies” exposed the level of stress among the employees in softorix technologies. It provided the information about measuring of stress level techniques which will helps to reduce the stress and promote a positive lifestyle. The percentage analysis, chi-square and t-test are used to analyzing the data. Finally the paper depicts the following factors had a close relationship with employee stress age, education, gender, workload, human relation, Relationship with peas and colleagues and physical requirement.

Dr. S. S. Jayasri (2014) conducted study on “Occupational Stress Among the Teacher of the Higher Secondary Schools in Madurai District – Tamilnadu” in her paper to determine the Occupational stress level of government and Aided school teachers in different socio culture and economic situation. She used five point scales for measuring the Occupational stress and the used percentage analysis, factor analysis for testing data. This study throws light on the fact that occupational stress is quite a personal matter and that the perception of the situations enables one to cope with it effectively, being aware of the cause of occupational stress and monitoring.

Dr. M. Prabhu, Dr. G. Madhanmohan (2014) conducted “A Study on Stress Among University Students in India” in his paper they analyse and compare the stress levels, anxiety and depression among Tamilian and Non Tamilian students of Pondicherry Central University. The author utilizes the statistical tools was mean, ANOVA, chi-square, correspondence analyse, Cluster Analysis, Correlation, Multiple Regression and suggest the special attention should be paid to them to address their problem and grievances. So that they get some helps to overcome their problems. The teaching faculty must concentrate on addressing anxiety which will automatically reduce stress among the students.

Dr. Lavanyavedagiri Rao (2013) a study about “Management of Stress Among College Students” she conducted exploratory study on how the college student are affected due to stress. Further study involves perceived levels of stress and detecting sources of stress among the college students. The author used only the percentage analysis to examine the data. The majority of the students experienced high level of stress due to financial problems & low energy levels uncertain future and the career opportunities. The women college students are aware of the stressors and do adopt some techniques to cope up and manage the stress. However the technique involves the dependence of the respondents on themselves and are not keen on seeking others help.

According to 3omoniyimary Bankeyabo (2013) studied “Sources of Work Place Stressors Among University Lectures in South West Nigeria”, reveals list out of sources affect the Nigeria Lecturer due to stress. The author used four point scales to analyze the data. He used gender wise details of measuring the level of stress. The findings of the study was stressors remain unattached to the level of perceived stress among university lecture will remain a permanent future. This may be very detrimental not only to the individual lectures but to the nation in general.

Objectives of the study

Primary objectives
- To analyse the overall study of stress among assistant professor in private universities at Chennai City.

Secondary objectives
- To identify the level of stress among Assistant professor working in private universities at Chennai.
- To suggest the ways how to manage the stress.

Research Methodology

This study deals with stress level of assistant professor in private universities at Chennai city (like
VelsUniversity, SRM University, Sathyabham University, and Hindustan University). Above four universities were selected for the present research. In that four university 15 members are selected in each of the department in Management as sample. The relevant primary data are collected from the respondents with help of structured interview schedule. The collected data are classified and tabulated. The data analysis is done with the help of percentage analysis and chi-square method.

Analysis and Results

The following are the additional demographic information’s that the study shows 67 per cent of the professor falls under the female category. In that, there are 37% of the teachers falling under the age group between 30 to 35 years. 48 percentage of the professors earn 20000- 30000 per month. Finally the 83% of the professors are married.

Hypothesis of the study:

• \(H_01\) – There is no association between male and female Asst.Professors with regard of level of stress
• \(H_02\) - There is no association between Experience of Asst.Professors and the Level of stress
• \(H_03\) – There is no association between Income of the Asst.Professors and the Level of stress.

Statistical Analysis – t-test & Chi - Square test:

\(H_01\) : There is no association between male and the female Professors with regard to level of stress.

\(H_02\) - There is no association between Experience and the Level of Stress.

Table 1: Shows Independent sample t- test for male and female with regard of level of stress

<table>
<thead>
<tr>
<th>Components</th>
<th>Male</th>
<th>Female</th>
<th>T.Value</th>
<th>P.Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>Mean</td>
<td>S.D</td>
</tr>
<tr>
<td>LOS 1</td>
<td>2.25</td>
<td>.639</td>
<td>2.18</td>
<td>.594</td>
</tr>
<tr>
<td>LOS 2</td>
<td>2.35</td>
<td>.489</td>
<td>2.55</td>
<td>.504</td>
</tr>
<tr>
<td>LOS 3</td>
<td>2.55</td>
<td>.605</td>
<td>2.85</td>
<td>.770</td>
</tr>
<tr>
<td>LOS 4</td>
<td>3.20</td>
<td>.696</td>
<td>3.18</td>
<td>.636</td>
</tr>
<tr>
<td>LOS 5</td>
<td>2.90</td>
<td>.788</td>
<td>2.95</td>
<td>.749</td>
</tr>
<tr>
<td>LOS 6</td>
<td>3.20</td>
<td>.616</td>
<td>3.23</td>
<td>.620</td>
</tr>
</tbody>
</table>

Notes: Denotes * the Signification level at 5%

(Notes : Hence LOS 1- Work Burden, LOS 2 - Job Security, LOS 3 - Over Timings, LOS 4 - Promotion Criteria, LOS 5 - Lack of Family Support, LOS 6 - Role Ambiguity)

Inference:

Since \(P\) value is less than 0.05. The Null Hypothesis is rejected at 5% level with regard to Level of Work burden, Over timings and Lack of family support of the professor. Hence there is significance different between male and female professors with regard to the work burden, over timings and lack of family support. Then comparatively the female professors have felt more stress than the male professors due to Lack of family support.

There is significance difference between male and female professors with regard to levels of stress. Since \(p\) value is greater than 0.05. Hence the null hypothesis is accepted at 5 % level with regard to Job security, Promotion criteria, Role ambiguity.

\(H_02\) - There is no association between Experience and the Level of Stress.

Table 2: Shows Chi-Square test of experience with regard of Level of Stress

<table>
<thead>
<tr>
<th>Components</th>
<th>Pearson value</th>
<th>P.Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS 1</td>
<td>5.436</td>
<td>.710</td>
</tr>
<tr>
<td>LOS 2</td>
<td>16.465</td>
<td>.040*</td>
</tr>
<tr>
<td>LOS 3</td>
<td>13.441</td>
<td>.033*</td>
</tr>
<tr>
<td>LOS 4</td>
<td>12.517</td>
<td>.030*</td>
</tr>
<tr>
<td>LOS 5</td>
<td>8.853</td>
<td>.715</td>
</tr>
<tr>
<td>LOS 6</td>
<td>8.616</td>
<td>.376</td>
</tr>
</tbody>
</table>

Notes: Denotes * the Signification level at 5%
Inference:

Since, p value is less than 0.05 the null hypothesis is rejected at 5% level of significance. Hence concluded there is association between experience and the level of stress on job security, over timings, and promotion criteria. The level of job security and over timings is having better than the promotion criteria.

There is no significance difference between Experiences of the professor with regard to the level of Stress. The p value is greater than 0.05 hence, the null hypothesis accepted at 5% level with regard to job security, over timings and promotion criteria.

\( H_0 \): There is no association between Income and the Level of Stress.

Table 3: Shows Chi-square test of Income with regard of Level of Stress.

<table>
<thead>
<tr>
<th>Components</th>
<th>Pearson Value</th>
<th>P.Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOS 1</td>
<td>12.817</td>
<td>.011*</td>
</tr>
<tr>
<td>LOS 2</td>
<td>4.582</td>
<td>.333</td>
</tr>
<tr>
<td>LOS 3</td>
<td>15.766</td>
<td>.020*</td>
</tr>
<tr>
<td>LOS 4</td>
<td>11.957</td>
<td>.449</td>
</tr>
<tr>
<td>LOS 5</td>
<td>4.114</td>
<td>.847</td>
</tr>
<tr>
<td>LOS 6</td>
<td>2.596</td>
<td>.957</td>
</tr>
</tbody>
</table>

Notes: Denotes * the Signification level at 5%

Inferences:

Since, the P value is less than 0.05 Null Hypothesis is rejected at 5 % level with regard to level of work burden and over timings of the Asst.Professors. Hence there is significance difference between income of the respondent with regard to the level of over timings and work burden Criteria’s.

There is no significance difference between Income of the professor and the level of stress. Since the p value is greater than 0.05. Hence, the null hypothesis is accepted at 5% level in the case of job security, promotion criteria, lack of family support, role ambiguity.

Limitation of the study:

- This study only covered four Private Universities in Chennai city alone.
- As the study done within the limited period. So the investigator could not select sufficient large sample for the study.
- Lack of interaction due to their busy schedule.
- The university professors were resistant to give correct information.

Scope of study:

In the present situation the work load and Work pressure is too more to all kind of people. Stress is a mental and emotional strain. Stress promotes various disorders. This study is only about the stress sphere of Assistant Professors in private universities at Chennai level. This paper helps them know how to handle the stress with few managing techniques. In this stream, the professors also need some support from the management side. Especially in job security and personal safety etc. The management can understand that “less stress work more” so without stress they render effective and efficient services to the management as well as to the Society.

Findings

- From this study the 83% of the Asst.Professors are married.
- 67 percentage of the respondent in female categories.
- 62% of the Respondent sometimes feels anger at the time of work due to stress.
- From this study show the female professor have more stress comparatively to the male professor. The female Professor has affected stress mainly due to the lack of family support, and work burden. The male professor have seriously affected due to the stress for the reason of job security and over timings.
- There is no significant difference between Experience, Income and level of stress in the case of job security, over timings and promotion criteria.

Suggestions:

From this study we have identify the that due to Management involvement, Heavy work load , family
commitment are the main factors of to increase the level of stress of the Assistant professors. The stress management should provide adequate training programmes and give counselling to the stressed teachers and individually they should follow the coping strategies like breathing, yoga, meditation, etc... That will helps them to improve their Performance achieving the targets in time allotted by management.

Conclusion

In the current scenario, Education plays a most important role in developing individual as well as whole environment (society). In that, a major part will be played by Professors (handling young generation-College Students). Stress at the workplace not only by the work overload and time pressure, but also by lack of rewards and prizes and most importantly, by not providing individuals with the autonomy to do their work as they would like. The management of Universities have to manage people at work differently, treating them respect and valuing their contribution. If they enhance the psychological well-being and health of Professors in the coming future the establishment make more revenue as well as employee retention.

The management have to consider their work stress. The Work burden and handling the students are the main reason for causing Stress. The management can appoint additional members like attenders (clerks and helpers) to reduce their work burden and over timings schedules and provides rewards, awards to motivate them and contribute their services to the society. Every professor should utilize their opportunities and developing to their skills and finishing their target as successfully.

**Ethical Clearance**: NIL

**Sources of Funding**: NIL

**Conflict of Interest**: NIL

**References**

2. Lavanyavedagiri Rao, Management of Stress Among College Students, June 2013, vol-3(1).
3. Omoniyimary Bankelyabo, Sources of Workplace Stressors Among University Lectures in South West Nigerias: Implication for Counselling, (AIIC: 2013, 24-26).
4. M.Prabhu, Dr. G. Madhanmohan, A Study on Stress Among University Students in India, (e-ISSN: 2347-685X), (Jun 2014), vol-1(4).
5. Ravi , R. Kadhirvel, A Study on Stress Management of School Teachers with Special Reference to Erode District,( e-ISSN:2249-555X),(Apr-2016),vol-6(4).
Recommendation System for Breast Cancer Treatment Using K-Means Clustering Algorithm

Somil Jain¹, Manmohan Sharma², Puneet kumar²

¹Lecturer, ²Assistant Professor, Department of Computer Science, Mody University, Lakshmangarh

Abstract

Data Mining is one of the technology that is generally used healthcare industries now a days. As it helps in number of ways to the end users like doctors and patients. Doctors can prescribe medicine on the basis of mined data whereas patients can be categorized on the basis of severity type of disease and get treatment accordingly. In this paper we have designed a health recommendation system based on k-means clustering, using this approach it is easier for the doctors to segregate the breast cancer patients on the basis of their stages. Once the patients are categorized treatment is given to them accordingly.

Keywords: Recommendation system, K-Means, Healthcare.

Introduction

When we talk about the knowledge discovery from the data then data mining plays an important role by applying some intelligent patterns to generate the results. There are several benefits of using data mining techniques like early detection, medical solution availability, possible treatment methods and it also helps in creating new health care policies⁴. Different tools and techniques of data mining helps in discovering and understanding the hidden pattern in a dataset. Generally, there are two types of learning available in the data mining i.e. supervised and unsupervised. Clustering is considered as the unsupervised method. Here the set of data is partitioned into different groups in order to achieve higher similarity⁴ ratio between the objects of the same group. It has a wide application area which includes image processing, pattern recognition, analysis of purchase pattern of the customer. This paper aims to provide a recommendation system for the breast cancer patients with the help of cloud-based clustering using WEKA Tool.

Data Mining in Health Care

In the medical field a small error can be more harmful and costlier too, due to different types of medical errors many people’s losses their lives each year. In order to reduce the ratio of death due to various chronic diseases a smart recommendation is needed which provides the opportunities to reduce the medical errors and enhance the safety of the patients. Data mining techniques are very useful in developing such types of recommendation systems because of their capability of extracting the hidden pattern and relationship between the data.⁴ For storage of data we use cloud computing as cloud provides a very cost-effective solution. As Prediction of the outcome of a disease¹⁰ is very typical now days due to enormous amount of data and there complex structure so by using data mining tools and techniques it can be quite convenient to predict the outcomes on the basis of different variables¹²,¹⁹ of a large dataset. Data mining applications are also helpful for various stakeholders associated with healthcare like hospitals¹¹, clinics, doctors and patients by identifying the best possible treatments and suggestions. Data mining combines the various approaches to group the data which can be useful for the knowledge discovery process, like statistical techniques, machine learning¹³, visualization etc. are some of techniques which uses data mining as there base. If we talk about the models of data mining then they are broadly classified into two categories: Descriptive modeling and Predictive modeling¹²,¹⁴,¹⁹. Healthcare industries needs a system that handles large and continuous increasing volume of patients using IT infrastructure. Using cloud we can form an interconnection between different computers and source of providing information specifically in healthcare industries²¹.
**Descriptive modeling:** These types of models in data mining are generally used for identification of the data patterns with the help of different association rules, clustering techniques.

**Predictive Modeling:** These types of models are generally used for data prediction by performing various types of analysis upon the data which includes classification and regression analysis.

**Related Work:**

Intarajak T, Kang SH\(^1\) according to them breast cancer is one of the most dangerous types of cancers across the whole world, it was also stated that in north America it is the second largest cause of death after the lung cancer. As the data collection is a very important aspect in diagnosing any type of chronic diseases so Stotter A, Bright N, Silcocks PB, Botha JL\(^2\) has suggested an efficient and improved way of data collection by using COX model, they also suggested that age plays an important role in survival prediction. Nyklíček I, Louwman WJ, Van Nierop PW, Wijnands CJ, Coebergh JW, Pop VJ,\(^3\) suggested that depression is also risk factor in breast cancer. Ogbuabor G, Ugwoke F.N.\(^4\) according to the author’s data mining tools and techniques are considered as an efficient way to discover the hidden pattern and to map the relationship between different objects, here the author has compared two clustering techniques namely K-means and DBSCAN for analysis and as per the execution time and accuracy of clustering K-means performs better it was also suggested that clustering techniques are being immensely used in the healthcare field in order to provide better diagnosis and prediction of diseases in a cost effective manner. Balasubramanian T, Umarani R.\(^5\) has used k-means clustering for analyzing the risk factors associated with fluoride contents of water on the human body. Zheng B, Yoon SW, Lam SS.\(^6\) has developed weight based K-means algorithm to identify the leukemia, inflammatory, bacteria or viral infection, HIV infection and pernicious anemia disease in order to check the efficiency of the algorithm and prediction of diseases. Liou DM and Chang WP\(^7\) has pointed that in medical field diagnosis about the disease is very poor, so they have suggested to use machine learning methods for prediction specifically in medical field. Ahmad LG, Eshlaghy AT, Poorebrahimi A, Ebrahimi M, Razavi AR\(^8\) suggested that the use of classifier is very crucial while performing diagnosis in medical science. Belciug S, Salem AB, Gorunescu F, Gorunescu M\(^9\) have compared the performance of k-means clustering algorithm with SOM i.e. Self-Organizing Map and they have implemented a network of clusters based upon real time decision system to detect the recurrence of breast cancer.

**Why Breast Cancer?**

Now a day’s breast cancer is one of the common disease found in women’s and it is one of the main causes of deaths as compared with other cancers\(^1,10,14,16\). In this disease the cells of human body change their characteristics and behave abnormally and the occurrence of this type of cancer is increasing globally and early detection\(^14,15,16\) of this type of disease can reduce the losses of life. It is very difficult to understand the exact cause of the breast cancer; there are some of the factors like age, history, genetic involvement, late pregnancy, depression etc. by which the developing cancer can be assessed\(^3\). Treatment to breast cancer are categorized in two parts mainly Systematic and local. Under local treatments we have surgery and radiation therapy whereas chemotherapy and hormonal therapy are under systematic treatments\(^10\). As the conventional approaches are not suitable in this case so the various machine learning\(^7,8\) and data mining techniques has created a new hope for health care diagnosis and prediction.

**Different Stages of Breast Cancer**

**Stage 1**

This stage describes invasive breast cancer in which cancer cells are breaking through to or they may invade normal surrounding breast tissue. In this cancer has not spread outside the breast and no lymph nodes are involved in it\(^1\).

**Stage 2**

- If the size of cancer cell is not more than 1 inch but it has spread under the arm in lymph node.
- If the size of cancer cell is between 1 to 2 inch and may and may not spread in the lymph node.
- If the size of cancer cell is larger than 2 inches, but has not spread to lymph node under arm

**Stage 3**

The stage 3 has further categorized into two
categories initial stage and advanced stage

At initial stage doctor may find any of these symptoms:

• If the size of cancer cell is less than 2 inches and is starting to spread to other lymph nodes.

• The cancer cell size is greater than 2 inches and has spread to the lymph nodes.

At advanced stage doctor may find any of these symptoms:

• Cancer cell has spread to skin, chest wall, and nearby tissues).

• The cancer cell has spread along the breast bone near lymph nodes inside the chest wall.

Stage 4

This stage describes encroaching breast cancer that has spread to nearby lymph nodes and other organs of the body, such as the lungs, lymph nodes which are distant apart, skin, bones, and liver.\(^1\),\(^17\).

Various types of suggested treatments for breast cancer are Surgery, Chemotherapy, Radiotherapy, and Hormonal Therapy.

Suggested treatment options based upon the different stages\(^18\):

1. For Stage 1 and Stage 2 the following treatment are prescribed.

a) Total mastectomy or lumpectomy with radiation may be needed.

b) Sentinel lymph node biopsy or axillary lymph node biopsy and possible radiation to supraclavicular or at internal mammary lymph node.

c) Hormonal therapy is prescribed only for those patients who have hormone-receptor-positive cancer.

d) Chemotherapy may be given as safe side to reduce the risk of recurrence.

e) Targeted therapy is applicable when the patient is HER-2 positive.

2. Stage 3:

a) Radiated total mastectomy OR chemotherapy to shrink the tumor by following lumpectomy and radiation.

b) Axillary lymph node removal and to give radiation to the supraclavicular or internal mammary lymph node.

c) At this stage doctor recommend Chemotherapy.

d) Hormonal therapy is prescribed only for those patients who have hormone-receptor-positive cancer.

e) Targeted therapy is applicable when the patient is HER-2 positive.

f) At this stage other parts of the body does not require any treatment.

3. Stage 4:

a) Radiation, Surgery or they can be used together depending upon different factors.

b) If the size of lymph node is increasing then treatment to this node is essential.

c) At this stage doctor recommend Chemotherapy.

d) Hormonal therapy is recommended always when the cancer is hormone-receptor-positive.

e) Targeted therapy is used to treat both HER-2 positive and HER-2 negative with BRCA1 and BRCA2 mutation.

f) Radiations can be used to treat various symptoms and comfortless in the other parts of the body.

Methodology

1. To carry out this work using data mining approach we have created a dataset based upon various parameters like tumor size (in cm), lymph node, HER-2, Estrogen-Receptor, Progestron-Receptor.

2. Based upon the above parameters we have created a data set by classifying the different stages of breast cancer as Stage 1, Stage 2, Stage 3, Stage 4.

3. After creation of the data set clustering is performed on the dataset using K-Means Clustering algorithm for recommendation of suggested treatment to the patient.

4. To perform Clustering on the data set Weka Tool of data mining is used.
About the data set

We have studied different datasets related to breast cancer patients available at Wisconsin Breast Cancer Database. From these datasets and symptoms of different breast cancer stages, we categorize breast cancer on the basis of number of different attributes like tumor size, lymph node etc. We collected data for these different attributes from different medical repositories and designed our own data set as shown in figure 1. As we are designing an approach for experimental purpose so the dataset size is not that much large.

K-Means Algorithm:

As the role of data mining is becoming very important now days in health care diagnosis and prediction, so various techniques like clustering, classification, association etc. are used for this purpose. Clustering is a type of unsupervised learning which is used to group the objects of similar type that groups are known as “clusters”.

K-means clustering algorithm is most widely used method in the health care industry due to its simple use and performance in other research fields. In K-Means clustering algorithm clusters are to be pre-specified before deploying the algorithm. It works in two parts in first part centroids are selected randomly which consists a fixed value for K and in the second part allocation of data point is done to their closest Centre.

Steps to perform clustering:

1. Fetch the data from the database
2. Data is to be preprocessed to get appropriate features.
3. Decide the parameters for which clustering is to be done.
4. Apply the relevant clustering algorithm.
5. Visualize the results.

Discussion

Here we have create structured data set with the attributes like tumor size (in cm), lymph node, HER-2,
Estrogen-Receptor, Progesterone-Receptor, on the basis of the values for these attributes we have clustering using k-means algorithm. The advantage of that k-means provides tighter clustering for global data. As shown in figure 3 four clusters are formed on the basis severity level for different stages. Figure 2 shows instances of different clusters and it is clear from the figure that the cluster 0 has more number of severe patients of stage 4. So patients in this cluster require more and quick attention.

**Conclusion and Future Work**

It is clear from the work that k-means clustering performs better when used with most predictive variables. The proposed methodology is expected to help the therapeutic specialists by giving snappy, exact and solid suggestion as in our results the instances show the severity level and number of patients suffering from breast cancer, so on the basis of obtained clusters the recommendation system will assist the medical practitioners to take appropriate decision. Here we have created structured data set but in future we explore prediction for unstructured data set.

**Ethical Clearance:** Not Applicable.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**


Effect of Core Training with and without Yogic Practices on Selected Psychological Variables among College Women Athletes

R. Meera¹, R. Mohanakrishnan², T. Arun Prasanna³

¹Research Scholar, ²HOD, ³Research Scholar, Dept. of Physical Education and Sports Sciences, SRMIST, Kattankulathur

Abstract

The study aims to examine the effect of core strength training with and without yogic practices on sports achievement motivation among college women athletes. To achieve the purpose of the study forty five (N=45) women athletes were selected randomly as subjects from Chennai city, Tamilnadu, India aged between 17 to 25 years. Three groups with fifteen subjects each were selected randomly and named as experimental group - I core strength training group, experimental group - II core strength training with yogic practices and group – III control group. The subjects were tested before and after the twelve weeks of experimentation. The core strength training and the yogic practices were selected as training protocol. The core strength training was given based on stress given in each exercises and sets, and the load was administered between 5 to 10 repetitions in a set with the time labs of 15 to 10 seconds for a set. The training protocol was followed by proper warming up and cooling down regime. The yogic practice was given in the morning time with proper prayer and warming up practice. The load of the yogic practice was increased by the number of yogic practices by 2 to 8 repetitions with 2 to 5 sets. The obtained data from the experimental and control group with the initial and final readings were analyzed statistically with analysis of covariance (ANCOVA) and Scheffe’s post hoc test was applied to examine the difference between groups and testing condition. The level of confidence was fixed 0.05. Result of the experimental group had significant improvement on sports achievement motivation when compared to control group.

Keywords: Core strength training, Yogic practice, Women Athletes, Sports Achievement Motivation, ANCOVA

Introduction

Core strengthening has drifted to excel in the sports medicine world. Its ethics are followed by familiar programs such as Pilates, yoga and Tai Chi for fitness. The motivation for sports achievement has been developed through the wide beneficial effects of the code stabilization thereby avoiding injuries and enhancing the athletic performance.¹ Muscular box with front abdominals, back paraspinals, gluteals, roofed diaphragm, pelvic floor and bottomed girdle musculature form a core.² Twenty nine pairs of muscles inside this box helps in the stabilization of the spine, pelvis and kinetic chain for functional movements They act all the way through the thoracolumbar fascia known as the “nature’s back belt”. Regular progressive stages form a core exercise program. It starts with the re-establishment of the length of normal muscles and the mobility for rectifying the instability of the muscles. The efficiency and perfection of the joint movement depend on the sufficient length of the muscles and sports achievement motivation.³ Many studies show that the individuals with core muscles deprived of sports achievement motivation will show signs of core weakness. Further more studies reveal that the individuals with lower back pain which is chronic can have higher level of fatigability, lower cross section and higher paraspinal muscles with fatty infiltration.⁴

Also core instability leads to musculoskeletal injuries in the high level athletes. Female athletes with core weakness are subjected to injuries in the anterior
cruciate ligament. They find imbalance and inability in compensating trunk perturbation that are unexpected. Hence the exercises for core stability with well built speculative basis prevent varied musculoskeletal conditions thereby treating spinal disorders. Yoga is a form of practices carried out physically and mentally, has its origination in India over three thousand years ago. It aims to provide us with high potential and achieve health and happiness.

Hatha Yoga initiates the body to work at the structural level, by levelling the vertebrae, increasing sports achievement motivation and strengthening the muscles and the connective tissues. The toning and the rejuvenation of the internal organs; the purification of the epidermal, digestive, lymphatic, cardiovascular, and pulmonary systems; the toning and the stability of the nervous and the endocrine systems; and the nourishment and stimulation of the brain cells are executed simultaneously. The concluding products are the high clarity of mental processes, stabilization of emotions and intellectual well being. Hence Yoga exercises help the human body and breath to get closely connected with the mind.

The mobility and flexibility of a person are improved through the postures of yoga by releasing tension and stress. The optimization of the basic yoga principle connecting body and mind is necessary for the restoration of the normal phase of sports achievement motivation. Perfect shape of the body is not sought during asana, rather passion is required. It guides us to love ourselves by cherishing the present life. The stretching of yoga advances a person’s sports achievement motivation. There prevails a mistaken belief that one must be flexible to perform yoga. The muscles groups in the three areas such as hamstring, hip and shoulders are improved through the yogasanas.

Sports achievement motivation or the freedom to move is defined as the capability of a person’s joint to move like a fluid with varied complete motions at a requires speed. It comprises regular range of movements devoid of undue stress towards the musculo tendinous unit. Many other factors related to performance are linked with sports achievement motivation. It directs a wide extent of motions involving joints in the ex-shoulder, hip, and ball and socket. It develops the strength and speed of the muscles with an effect of saving energy. Motor skills require the joints with an adequate level of sports achievement motivation. Hence, it helps in acquiring higher movement economy. Inaccurate movement executions are observed when the sports achievement motivation is insufficient.

An injury caused through shock and forces externally can be protected through sports achievement motivation. Also it is possible only when the injuries are at the optimum level. There are two kinds of sports achievement motivation namely passive and active. The capability of a person to execute wide range of movements with external assistance such as stretching with partner is called Passive sports achievement motivation whereas the capability of a person to perform a large range of motions devoid of any assistance is known as Active sports achievement motivation. In the view of angle with the above studies, the present study explores the effect of core strength training with and without yogic practices on sports achievement motivation among the college athletes.

Statement of the problem

The study aims to examine the effect of core strength training with and without yogic practices on sports achievement motivation among college women athletes.

Methodology

For achieving the aim of the study, forty five (N=45) women athletes were selected randomly as subjects from Chennai city, Tamilnadu, India aged between 17 to 25 years at random. Three groups with fifteen subjects each were selected as experimental group - I core strength training group, experimental group - II core strength training with yogic practices and group - III control group. The subjects were tested before and after the twelve weeks of experimentation. The core strength training and the yogic practices were selected as training protocol. The subjects were trained with core strength based on stress given in each exercises and sets, and the load administered between 5 to 10 repetitions in a set with the time labs of 15 to 10 seconds for a set. The training protocol was given with proper warming up and cooling down regime. The yogic practice was provided in the morning time making the subjects involve in proper prayer and warming up practice. The load of the yogic practice was increased by the number of yogic practices by 2 to 8 repetitions with 2 to 5 sets. The core training protocol were Crunches, Decline Crunch, Cable Crunch, Oblique Crunches, Jackknife Sit-Up, Barbell Side Bend,
Leg lift, Leg lift - Hang Position, Oblique Leg lift and yogic practices protocol were Suryanamaskar, Tadasana, Trikonasana, Paschimottanasana, Chakrasana, Bhujangasana, Nadi Sodhana, Bastrika, and Kapalapathi. The criterion variables were measured using SAMT inventory. The initial and the final readings derived from the experimental and the control group underwent a procedure of statistical analysis using ANCOVA i.e., Analysis of covariance with Scheffe’s post hoc test to evaluate the difference between the groups under different testing conditions. The IBM-SPSS – v21 software was used and the confidence level is maintained at 0.05.

### Results and Discussions

#### TABLE I: The descriptive analysis of experimental and control group on achievement motivation

<table>
<thead>
<tr>
<th>Test</th>
<th>Core Strength Training group</th>
<th>Core Strength Training with Yogic practice group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Test</td>
<td>Mean 22.20</td>
<td>23.20</td>
<td>22.80</td>
</tr>
<tr>
<td></td>
<td>SD 1.37</td>
<td>0.77</td>
<td>1.26</td>
</tr>
<tr>
<td>Post Test</td>
<td>Mean 25.66</td>
<td>28.26</td>
<td>23.93</td>
</tr>
<tr>
<td></td>
<td>SD 0.61</td>
<td>1.70</td>
<td>1.09</td>
</tr>
<tr>
<td>Adjusted Post Test</td>
<td>Mean 25.68</td>
<td>28.25</td>
<td>23.93</td>
</tr>
<tr>
<td>Magnitude of Improvement</td>
<td>13.55%</td>
<td>17.87%</td>
<td>4.72%</td>
</tr>
</tbody>
</table>

#### TABLE II: ANCOVA on achievement motivation among groups

<table>
<thead>
<tr>
<th>Test</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>‘P’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Test</td>
<td>7.60</td>
<td>2</td>
<td>3.80</td>
<td>2.79</td>
<td>0.073</td>
</tr>
<tr>
<td></td>
<td>57.20</td>
<td>42</td>
<td>1.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Test</td>
<td>142.71</td>
<td>2</td>
<td>71.35</td>
<td>47.42*</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>63.20</td>
<td>42</td>
<td>1.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjusted Post Test</td>
<td>137.51</td>
<td>2</td>
<td>68.75</td>
<td>44.65*</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>63.13</td>
<td>41</td>
<td>1.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 confident level

#### TABLE III: Scheffe’s post hoc test of paired mean difference on achievement motivation

<table>
<thead>
<tr>
<th>Core Strength Training group</th>
<th>Core Strength Training with Yogic practice group</th>
<th>Control Group</th>
<th>Mean Difference</th>
<th>‘P’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.68</td>
<td>28.25</td>
<td>-</td>
<td>2.56*</td>
<td>0.000</td>
</tr>
<tr>
<td>25.68</td>
<td>-</td>
<td>23.93</td>
<td>1.75*</td>
<td>0.000</td>
</tr>
<tr>
<td>-</td>
<td>28.25</td>
<td>23.93</td>
<td>4.31*</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*Significant at 0.05 confident level
The results as in table I - III obtained prior to the training programme were found similar. The results from the post test on the chosen variables of the experimental and the criterion variables were found significant. Also, the adjusted post test paired mean differences through the Scheffe’s post test based on the sports achievement motivation between the groups like isolated core strength training and core strength training with yoga training, isolated core strength training and control training, and core strength training with yoga training and control training are found to be significant with 0.000 p value. Therefore, the results indicated a significant improvement on the sports achievement motivation in the group with isolated core strength training and in the group with isolated core strength training with the yoga training. The control group showed an insignificant performance on the sports achievement motivation. The data is represented graphically in Figure I and II.

![Figure I](image1.png)  
**FIGURE I:** The graphical presentation of data of descriptive statistics on sports achievement motivation

![Figure II](image2.png)  
**FIGURE II:** The graphical presentation of magnitude of improvement from the initial to final means on sports achievement motivation

**Discussion on Findings**

The study resulted that twelve week training with the core and yoga training, and the isolated core training has significant improvement in comparison with the control group. Hence this study is similar to the observations of the previous research. França et al\(^1\) pointed out that the advantages of using core strength training over the usual resistance training gives the clear demonstration of the disability evaluation instruments compared with the pain evaluation instruments. Though the exercises involved in the training for core strength and trunk balance seem to be challenging, they help in reducing disability. In addition, patients are well benefitted with such kind of training than the pain reduction methods.\(^12\) As evaluation instruments produce results that are objective and distinctive, it is suggested to use them in the future studies to examine the impact of core strength training on the patients with low back pain.\(^13\) A ten day session with asana, pranayama, tratakas i.e., gazing with concentration, meditation and devotional practices can improve the finely coordinated movements in a significant way.\(^14\)

Yoga practices have the ability to reduce the level of optical illusion caused by the Muller-lyer lines, increase the critical fusion frequency, neural performance and reduce fatigue and stress level.\(^15\) Various motions through joint systems yoga training are improved through the training on sports achievement motivation and yoga. Athletes involving in warm-ups with stretching exercises show better improvement on their sports achievement motivation.\(^16\) It is obvious that the core strength with yogic training will yield better results compared with the isolated training. The control group showed null improvement on the sports achievement motivation.

**Conclusion**

On the whole, the motivation for sports achievement of the students in both the experimental groups is significantly improved than the control group. Also, the experimental group with the core and yogic training showed better improvement than the experimental group with the isolated core training on the sports achievement motivation.

**Conflict of Interest** - Nil

**Source of Funding** - Self

**Ethical Clearance** - Nil

**References**

2. Hicks GE, Fritz JM, Delitto A, McGill SM. Preliminary development of a clinical prediction rule for determining which patients with low back pain will respond to a stabilization exercise program. Archives of physical medicine and rehabilitation. 2005 Sep 1;86(9):1753-62.


Bhupinder Kaur Anand¹, MPS Marwaha², Sudhanshu Agrawal³, Dipti Singh⁴, Sapna Jaiswal⁵, Salil Kumar Srivastava⁶

¹Professor, Department of Community Medicine, SGT Medical College, Gurugram, ²Classified specialist Aviation Medicine, Air Force Central Medical Establishment, New Delhi, ³MDS (Periodontist) , Consultant Dentist, Part time Specialist, Air Force Station, BKT, Bakshi Ka Talab, ⁴Associate Professor Deptt of Oral Medicine and Radiology, Chandra Dental College & Hospital, ⁵Tutor, Department of Biochemistry, Lam Manohar Lohia, Lucknow, ⁶Professor & HOD of Pharmacology, Department of Pharmacology, Government Medical College, Badaun

Abstract

Aim: To evaluate the prevalence, extent and severity of periodontal disease and tooth loss among rural and urban adult population of northern Indian in local areas of Bakshi Ka Talab district.

Methods: A cross-sectional study was conducted among 1200 adults (632 males, 568 females) aged 35-74 years in urban and rural areas of Bakshi Ka Talab district, U.P., India. Data was collected by an interview followed by clinical examination.

Results: Mean number of missing teeth per person was 4.2 ± 7.4. At least one tooth missing was observed among 51.8% of subjects and 5.2% were completely edentulous.

Conclusion: The insights gained illustrate that tooth loss was highly prevalent in this rural Bakshi Ka Talab district population.

Keywords: Age, Adults, Education, Smoking, Tooth Loss

Introduction

One of the most important oral health indicators is the ability to retain more number of teeth throughout life. Oral health goals recommended by World Health Organization for the year 2020 has stated that there should be an increase in the number of individuals with functional dentitions (21 or more natural teeth) at ages 35-44 and 65-74 years [¹]. Tooth loss is the result of complex interaction of factors, of which the clinical condition of the tooth like caries, periodontal disease or trauma may only be the triggering factors, rather than the one single reason for loss of teeth. It is said to vary by age, gender, race, education, income and by geographic region [²]. Cultural factors, accessibility and availability of care, cost of care, individual’s attitudes and beliefs about perceived need for dental care and importance of maintaining the dentition interplay in the decisions of whether or when to extract a tooth. It is an outcome of treatment decision as well as disease [³].

Tooth loss impairs the quality of life, often substantially and affects the well being of the person. Missing teeth can interfere with chewing ability, diction, and esthetics. Low self-esteem related to tooth loss can hinder an individual’s ability to socialize, hamper the performance of work and daily activities, and lead to absence from work [⁴]. Hence, preservation of natural dentition should be the ultimate goal of the dental profession.

Information about the frequency of tooth loss and its risk factors in developing countries is sparse, particularly in Brazil and other Latin American countries. A study conducted in 2001 surveyed major metropolitan area
in Brazil and estimated a mean tooth loss of 11.2 teeth, which varied between 5.5 and 20.2 teeth in the 30-39 and 60+ years age groups, respectively \[^5\]. Prevalence of edentulism was 39.5\%, and mean tooth loss was 20.2 (SE=0.6). Older individuals [Odds Ratio (OR)=2.2], women (OR=2.3), white people (OR=5.9), individuals of lower socioeconomic status (OR=5.6) and smokers (OR=3.5) had higher likelihood of being edentulous \[^6\]. Tooth loss accounts for a high frequency among subjects aged over 60 years in Sri Lanka (20.7 ± 10.7) \[^7\]. Low education and low income were moderately [Relative Risks (RR) between 1.6 and 2.0] associated with tooth loss among both women and men in Germany \[^8\].

Relatively very few studies have been conducted to know the risk indicators associated with tooth loss among Indian adults \[^9,10\]. They reported that perceived need and attitudes towards dental care had an important influence on use of care. The older people prompted to have a fatalistic attitude and were least likely to attend the dentist.

**Materials and Method**

**Study design and setting**

A descriptive, cross-sectional study was conducted to evaluate the risk indicators associated with tooth loss in urban and rural adult population of Bakshi Ka Talab district, India, during August to October 2011.

**Sampling design and study population**

A total of 1293 subjects were approached to participate in the study but 93 declined citing a variety of reasons (response rate 92.8\%). Study sample of 1200 adults were recruited by a multistage stratified random sampling procedure.

**Methodology**

Data regarding the subject’s personal details, sociodemographic characteristics, diet, oral hygiene practices (materials used and frequency of cleaning), habits (smoking/ chewing tobacco and alcohol consumption), oral health knowledge, availability and utilization of dental services and self perceived oral health and need for treatment were recorded on a specially designed proforma. On an average 15-20 subjects were interviewed and examined per day. Amongst the sample of 1200 study subjects, 632 were males and 568 were females. Single investigator who was trained and calibrated performed all oral examinations (kappa value=0.90)\[^11-15\].

**Findings**

The study sample comprised of 1200 adults, aged 35 to 74 years with mean age of 50.9 ± 10.78 years. They included 565 (47.1\%) subjects from urban and 635 (52.9\%) subjects from rural areas. Of these, 632 (52.7\%) were males and 568 (47.3\%) were females. Table 1 show that 43\% of subjects (44.2\% urban adults, 41.7\% rural adults) had an intact dentition, with no tooth loss. Complete (5.2\%) and partial (51.8\%) edentulousness was comparatively higher among the rural adults (p=0.05) and males (p=0.007) in particular.

**Table 1. Tooth Loss according to Place of Residence and Sex among the Study Population.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sex</th>
<th>No tooth loss n (%)</th>
<th>Completely edentulous n (%)</th>
<th>Partially edentulous n (%)</th>
<th>χ value p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban (n=565)</td>
<td>Males</td>
<td>119 (40.8)</td>
<td>15 (5.1)</td>
<td>158 (54.1)</td>
<td>χ = 10.774 and p=0.224</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>131 (48)</td>
<td>12 (4.4)</td>
<td>130 (47.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>250 (44.2)</td>
<td>27 (4.8)</td>
<td>288 (51)</td>
<td></td>
</tr>
<tr>
<td>Rural (n=635)</td>
<td>Male</td>
<td>126 (37.1)</td>
<td>23 (6.8)</td>
<td>191 (56.2)</td>
<td>χ = 20.794 p=0.05*</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>139 (47.1)</td>
<td>13 (4.4)</td>
<td>143 (48.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>265 (41.7)</td>
<td>36 (5.7)</td>
<td>334 (52.6)</td>
<td></td>
</tr>
<tr>
<td>Overall (n=1200)</td>
<td>Males</td>
<td>245 (38.8)</td>
<td>38 (6.0)</td>
<td>349 (55.2)</td>
<td>χ = 25.476 and p=0.007*</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>270 (47.5)</td>
<td>25 (4.4)</td>
<td>273 (48.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>515 (43)</td>
<td>63 (5.2)</td>
<td>622 (51.8)</td>
<td></td>
</tr>
</tbody>
</table>
Test applied: Chi square test

*p ≤ 0.05 is Statistically significant

Table 2. Prevalence of tooth loss in relation to Socio-demographic characteristics among the study.

<table>
<thead>
<tr>
<th></th>
<th>Urban (n = 565)</th>
<th>Rural (n = 635)</th>
<th>Overall (N = 1200)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Mean (SD)</td>
<td>p-value</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>565 (47.1)</td>
<td>3.5 (6.8)</td>
<td>-</td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-44</td>
<td>187 (33.1)</td>
<td>1.0 (2.0)</td>
<td>a</td>
</tr>
<tr>
<td>45-54</td>
<td>187 (33.1)</td>
<td>2.6 (5.1)</td>
<td>b</td>
</tr>
<tr>
<td>55-64</td>
<td>130 (23.0)</td>
<td>5.2 (7.9)</td>
<td>c</td>
</tr>
<tr>
<td>65-74</td>
<td>61 (10.8)</td>
<td>10.7 (11.3)</td>
<td>d</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>292 (51.7)</td>
<td>3.9 (7.0)</td>
<td>t=1.12 0.26</td>
</tr>
<tr>
<td>Females</td>
<td>273 (48.3)</td>
<td>3.2 (6.5)</td>
<td></td>
</tr>
</tbody>
</table>

Student’s t-test and One way ANOVA with Bonferroni post-hoc test. (Values with same letter superscripted do not vary significantly)

*p ≤ 0.05 is statistically significant

Table 3. Tooth loss in relation to oral health knowledge and attitude among the study population.

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Mean (SD)</td>
<td>p-value</td>
</tr>
<tr>
<td>Belief that Losing teeth is normal with increasing age (n=565) (n=635) (N=1200)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>333 (59)</td>
<td>3.8 (7.0)</td>
<td>F**=3.44 &lt;0.05</td>
</tr>
<tr>
<td>No</td>
<td>79 (14)</td>
<td>1.7 (4.1)</td>
<td>F**=3.44 &lt;0.05</td>
</tr>
<tr>
<td>2.3 (4.9) b</td>
<td>153 (27)</td>
<td>3.9 (7.2)</td>
<td></td>
</tr>
<tr>
<td>Desire for replacement of missing teeth (n=315) (n=371) (N=686)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>191 (60.6)</td>
<td>7.5 (9.2)</td>
<td>t*=3.23 &lt;0.01</td>
</tr>
<tr>
<td>No</td>
<td>124 (39.4)</td>
<td>4.6 (5.5)</td>
<td></td>
</tr>
<tr>
<td>Utilization of Dental services (n=565) (n=635) (N=1200)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>355 (62.8)</td>
<td>4.6 (7.6)</td>
<td>t*=4.84 &lt;0.001</td>
</tr>
<tr>
<td>No</td>
<td>210 (37.2)</td>
<td>1.8 (4.7)</td>
<td></td>
</tr>
</tbody>
</table>

Student’s t-test and One way ANOVA with Bonferroni post-hoc test. (Values with same letter superscripted do not vary significantly)

*p ≤ 0.05 is statistically significant.
Discussion

Loss of teeth reflects a major public health problem in many countries. The prevalence of tooth loss among the adults of Bakshi Ka Talab district, India was 57%. Mean number of missing teeth (4.2) was higher in comparison with Haitian immigrants (2.64) of New York City [16]. Complete edentulousness was more prevalent among rural adults which is in conformity with few other studies [10,17,18]. Several other studies have shown no association between tooth loss and the place of residence [19,20].

Also, the attitude of the rural people is generally such that they elect to have their symptomatic teeth extracted rather than conserving those [18].

A directly proportional relationship was observed between age and tooth loss, which was lower than that found in National Oral Health Survey of India [9] and also among Saudi Arabian adults [19].

In the present study, females had fewer missing teeth than males. Though similar observation was found in other studies [17,20,21] few studies have shown female predominance [10,19,22] and also no difference in tooth loss [16,23,24]. Females are generally more concerned about their oral health and are more likely to choose preservation of their teeth over extraction. [23,26]

The level of education was found to be associated with tooth loss. In this study, people with higher levels of education had experienced less tooth loss. This result extends the finding of previous researches documenting that lower literacy level is associated with higher number of missing teeth. [10,21,23,24]

Conclusion

The findings of this study provide an insight into the prevalence of tooth loss which was observed to be higher among rural than urban adults in Bakshi Ka Talab district. The associated socio-demographic risk indicators responsible for increased tooth loss included age, males, illiterates and low socio-economic status groups.

Conflict of Interest: - No Conflicts of interest.

Source of Funding: - Self

Ethical Clearance: - Certificate from Head of the Institution where study has been carried out.

References

12. Kumar P. Social Classification-need for constant


Influence of Organizational Justice on Teachers’ Job Attitude – A Review

S Suganya
Assistant Professor, Department of Commerce, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai

Abstract

Teachers play an indispensable role in the educational sector. Teaching is one of the distinguished and an astonishing activity involving a diversity of skills, perceptions, sensitivity, attitudes and knowledge. A teacher’s growth is reflected in their attitudes, values, belief and philosophy. The most of the teachers have not attained good position in their workplace. Teachers have been facing unfair in the educational institution. Based on this context, plenty of literatures dealing with teachers’ job attitudes based on organizational justice exists in their institution both in India and outside India have been reviewed. The results showed that some researchers have identified the variations in the perception of justice among male and female teachers. Some studies focused on the level of satisfaction in work itself and the researchers also found the various causes of teachers’ job satisfaction. Some researchers have empirically investigated the dimensions of fairness in the organization and the researchers also highlighted that the justice in the distribution and procedure play an essential role in satisfaction of teachers.

Keywords: Teachers, Organizational Justice, Job Attitudes.

Introduction

Teachers play an indispensable role in the educational sector. Teaching is one of the distinguished and an astonishing activity involving a diversity of skills, perceptions, sensitivity, attitudes and knowledge. A teacher’s growth is reflected in their attitudes, values, belief and philosophy. Attitude is an inclination to act in a particular situation either favourably or un favourably. Attitude is the way of individual feels about a place, a thing, an idea or a situation. Teachers’ job attitude is indispensable because it affects their job behaviour. Job attitude is a psychological statement towards one’s job and its environment. Job attitudes can be measured either by observing the action of the teachers in phenomena or asking questions related to a particular situation. The most of the teachers have not attained good position in their workplace. Teachers have been facing unfair in the educational institution.

Literature Review

Prince et al., (2018) have indentified influence of job satisfaction and organizational justice on turnover intention among teachers. The researcher has used convenient sampling method for one hundred and fourteen teachers and structured questionnaire was used. The results showed that under the variables of job satisfaction, only pay contribution showing negative relationship on turnover intention and also the variables of organizational justice, distributive justice and procedural justice showing a significant relationship on turnover intention.

Demir (2016) has investigated the association between acuteness fairness in organization and teachers’ organizational commitment and work satisfaction via meta-analysis. The author has conducted a wide range of literature review to identify the relationship exists between perspicacity of teachers’ justice, work satisfaction and the organizational commitment. The results also revealed that the perception of interactional justice has shown a significant relationship with organizational commitment.

Mina et al., (2015) have examined the association of organizational citizenship behaviour, profession satisfaction, institutional commitment and organizational justice among physical education teachers’. The results showed that there exists a significant rapport among
profession satisfaction, institutional commitment, and organizational justice with institutional citizenship behaviour. Path analysis revealed that satisfaction in the job has directly related to institutional citizenship behaviour but organizational justice and commitment has indirectly associated with institutional citizenship behaviour.

Ufuk and Unsal (2015) have discovered the effects of organizational justice opinion on intention to quit and the mediating role of teachers’ process of organizational identification. The data was collected from 292 public primary and secondary school teachers in Turkey. Organizational recognition fully mediates the predictive effects on the acuteness of distributive justice on turnover intention, and also it partially mediates the predictive effects on perception of interpersonal justice on turnover intention.

Mirza et al., (2015) have investigated the relationship among organizational justice, organizational citizenship behaviour, psychological empowerment and organizational performance among bank employees in Pakistan. The data was collected from 250 bank employees and to test the hypothesis regression analysis was used. The results also exposed that the organizational citizenship behaviour has a mediating effect on employee psychological empowerment and perceived organizational performance.

Alireza (2014) has investigated the job satisfaction of teachers with perceived organizational justice. The data collected from 437 primary and upper school teachers from Sweden. In order to test the hypothesis MANOVA, Correlation and Multiple regression analysis were used. The results also revealed that dimensions of organizational justice have a significant predictor of job satisfaction of teachers. The researcher also found that procedural justice is the significant predictor than distributive and interactional justice.

Cemal (2014) has analyzed the effects of justice in organization, organizational cynicism and organizational commitment among teachers of primary educational institutions. The data was collected from 515 elementary school teachers and the researcher has used correlation analysis to test the hypothesis. The researcher also suggests that organizational justice perception and cynicism are quite significant variables in employees’ exposition of organizational commitment behaviour.

Hassan (2014) has examined the connection between organizational citizenship behaviours and organizational justice with organizational trust. The researcher collected 191 samples from Syrian private banks. The researcher found that there exist positive significant effect on organizational citizenship behaviours. The researcher also found that organizational trust performs as a mediating role in the association among organizational citizenship behaviours and justice in the organization.

Moosa et al., (2014) have analyzed the “relationship between organizational justice and job performance of Payamenoor university employees in Ardabil province”. The results revealed that there exists a significant optimistic relationship between job performance and organizational justice. Showed that there exist between job performance and procedural justice.

Yadigarjon and Aykut (2014) have identified the association between the opinion of organizational justice and the organizational commitment levels of the teachers working in a private educational institution in the city of Konya. The researchers suggested that the development of organizational justice and fairness behaviours of the managers can create positive results for the organizations and to achieve the employee commitment.

Figen et al., (2014) have examined the association between dimensions of institutional justice and trust in school principals in Ankara. The researchers have collected data from 470 teachers of state primary schools. The results demonstrated that there is optimistic liaison exists between the dimensions of justice and trust in school principals. The results also indicated that the sub-dimensions of organizational justice have related with high level.

Bekir and Ahmet (2014) have determined the association between the perception of institutional justice and institutional commitments among teachers in Ankara. The researchers found that there exists a positive association among teachers’ acuteness of institutional justice and institutional commitment behaviours.

Essam and Iman (2014) have identified the effect of perceived institutional justice on Egyptian teachers’ job outcomes. The researchers investigated the direct and indirect impact of institutional justice among teachers. The results found that justice in distribution has a significant liaison with job satisfaction of teachers than procedural justice.

George et al., (2014) have identified the effects
of perceived distributive justice on organizational commitment of teachers in public secondary schools in Kenya. The samples were collected from 334 public secondary school teachers randomly. The results found that distributive justice was shown as a poor predictor for commitment. The researchers suggested that management needs to follow the fair distribution of rewards.

27Ziad et al., (2014) have explored the association between justice in organization and satisfaction of job among physical education teachers in Jordanian. The researchers collected sample from 166 physical education teachers randomly. The results revealed that teachers of physical education departments’ perceived fairness in organization were positively satisfied with the job. The results also revealed that acuteness of interactional justice was the preeminent forecaster of job satisfaction of teachers followed by procedural justice and distributive justice.

1Aliakbar et al., (2013) have investigated the association among organizational justice dimensions, organizational commitment, trust and perceptions of teachers’ self-efficacy of educational supervisors. The researchers collected samples from 361 teachers from Karaj City. Correlation analysis was used to test the hypotheses. The researchers found that casual relationship exists between justice dimension, trust, and Commitment and teachers supervisory role in self-efficacy.

21Mubashar et al., (2013) have identified the rapport among organizational justice with job performance and satisfaction for performance appraisal. The correlation and regression analyses were used to test the hypotheses. The results also revealed that satisfaction towards performance evaluation showed a significant association with employee job performance.

12Khurran et al., (2013) has explored the association between organizational justice with job satisfaction and work performance. The researcher suggested that the management can use suitable strategies for increasing employee’s job satisfaction and the organization should take care of procedural and interactional justice in order to maintain employee more satisfied.

8Fariba et al., (2013) have examined the association between fairness in the organization and organizational commitment among staff in Chahar Mahal. The researchers have collected 150 samples and correlation analysis was used for hypothesis testing. The researchers have found that fairness in the organization has a direct significant association with organizational commitment. The researchers also suggested the managers should take the effort to increase fairness, commitment and satisfaction in a workplace and also to evolve fairness in the distribution of rewards, sponsorship, promotion and appointment process.

15Matthew et al., (2012) have identified the perception of fairness in the organizational and its impact on organizational commitment with mediating role of job satisfaction among police officers. The researchers also revealed that perception of procedural and interactional justice had a circuitous effect on the police officers’ organizational commitment. Lastly, the perception of fairness in the organization showed an indirect effect on satisfaction and organizational commitment.

14Marzieh et al., (2012) have examined the rapport between fairness in organization and organizational citizenship behaviour. The researchers found that there is a significant relationship between perceptions of justice and organizational citizenship behaviour. The results of MANOVA showed that there is no significant difference observed between components of justice based on the demographic profile of the respondents.

13Malik and Basharat (2011) have scrutinized the influence of organizational justice on the institutional commitment to higher education faculty in Pakistan. The researcher has collected data from 463 higher education faculty and regression analysis was used for hypothesis testing. The results revealed that the junior faculty had a positive effect on procedural justice and distributive justice towards institutional commitment.

24Sajjad (2011) has determined the association between organizational justice, emotional empowerment, organizational commitment, work satisfaction and organizational citizenship behaviour. The results also indicated that job satisfaction has significantly persuaded commitment and citizenship behaviour and commitment has direct association with organizational citizenship behaviour.

22Neetu et al., (2011) have identified that the Organizational Justice improves the effectiveness of organizations by the way of increasing work satisfaction and organizational commitment. The author suggested that the exercise of fair treatment and fair procedures are the key antecedent to promote organizational
Mehmet and Hasan (2011) have analyzed the effects of fairness in the organizational on the citizenship behaviour. Regression analysis reveals that there exist a significant association between fairness in the procedures and contribution to organizational development; transactional justice and commitment to the job; and distributive justice and involvement to organizational development, self-improvement, and more committed to their job behaviour.

David (2005) has identified the influence of cooperation and employee identification with procedural and distributive justice. The results discovered that the procedural and distributive justice have a strong influence in employee identification.

Findings of the Review

Studies conducted on teachers’ perception of justice in various institutions like Schools, Engineering colleges, Medical and Nursing Colleges faced unjust management practice. Majority of the studies have brought the association between perception of justice and their attitudes and behaviours in the organizations.

Some researchers have identified the variations in the perception of justice among male and female teachers. Some studies focused on the level of satisfaction in work itself and the researchers also found the various causes of teachers’ job satisfaction. Some researchers have empirically investigated the dimensions of fairness in the organization and the researchers also highlighted that the justice in the distribution and procedure play an essential role in satisfaction of teachers.

Conclusion

The researcher concludes that teachers’ organizational justice influenced teachers’ job attitudes both positively as well as negatively. Unjust practice in the educational institutions makes the teachers negative involvement in their job and less satisfaction but in case of fair justice makes the teacher more involvement in their job as well as showing higher level of job satisfaction.

Ethical Clearance: Nil
Source of Funding: Self
Conflict of Interest: Nil

References

2. Alireza, Z. Job Satisfaction and Organizational Justice as Predictors of Attitude Concerning Organizational Reform, Lunds University. 2014; 82.


Prevalence of Panton Valentine Leukocidin (PVL) gene of *Staphylococcus aureus* Isolated from Different Sepsis Cases in Odisha, India

Anima Mohanty1,2, Bibhuti Bhusan Pal2
1School of Biotechnology (KSUT), KIIT University-2, 2Microbiology Divisions, ICMR-Regional Medical Research Centre, Chandrasekharpur, Bhubaneswar, India

Abstract

Panton Valentine Leukocidin (PVL) gene of *Staphylococcus aureus* is a potent cytotoxin that causes infection in skin and soft tissues which further leads to life threatening diseases. In this study we investigated the prevalence of PVL positivity rate in selected *Staphylococcus aureus* positive strains isolated from different sepsis cases from Odisha. The samples were inoculated on MacConkey agar, blood agar and nutrient agar plates and significant colonies were tested biochemically. The pathogens were tested against different antibiotics following CLSI guidelines. Polymerase chain reaction (PCR assay) was performed to detect mecA gene and PVL gene using specific primers. Out of 530 strains 425(80.2%) were methicillin resistant *S. aureus* (MRSA) strains and 105(19.8%) were methicillin sensitive *S. aureus* (MSSA) strains. PCR analysis revealed that 373(70.4%) were PVL positive MRSA and 51(9.6%) were PVL positive MSSA strains. This study showed high prevalence of PVL gene of *Staphylococcus aureus* in community acquired infection. Thus it is highly essential to understand the pattern of infection that will help for the treatment and control of community acquired and hospital acquired sepsis caused by *S. aureus* in this region.

**Keywords:** Sepsis, *Staphylococcus aureus*, MRSA, PVL, Odisha

Introduction

*Staphylococcus aureus* causes diseases ranging from localized skin infection to life threatening septicemia in human beings. It is the most virulent and prevalent microbial pathogens that cause hospital acquired (HA) and community- acquired (CA) infection throughout the world1. Its most remarkable feature is the ability to acquire resistance to antibiotics, one of which results in methicillin resistant *S. aureus* (MRSA) strain. MRSA is commonly recognized as the multi-drug resistant pathogen in the world, its emergence is found in increasing number of infection and often multi-drug resistant pose serious therapeutic problems to clinicians2,3. Various virulence factors present in *S. aureus* enables the microbe to interact with host tissues and defend itself from the immune system, it also persists to cause organ dysfunction4.

Panton Valentine Leukocidin (PVL) gene is a cytotoxin and an important virulent factor of *S. aureus* which was first reported in 1932. This toxin causes serious skin and soft tissue infection and selectively disrupts leukocyte membrane leading to enhanced virulence5,6 PVL toxin is a bipartite toxin comprising of two proteins, Panton Valentine Leukocidin F (*lukF*-PV) and Panton Valentine Leukocidin S (*lukS*-PV).This toxic PVL gene found in MRSA strains causes community acquired infections7. Worldwide the prevalence of PVL positive *S. aureus* varies within different countries as 97% in United states3,10,12.8% in China9, 4% in Turkey11, 30% in Germany12, 1.8% in Ireland13, 11.6% in Singapore14 and 0.9% in Korea15. The prevalence of PVL

DOI Number: 10.5958/0976-5506.2019.00694.6
gene in India was detected in 16% of S. aureus isolates, predominantly in CA-S. aureus (82%) as reported by Eshwara, et al,(2013). PVL positive S. aureus has become global public health burden due to its rapid emergence. This global emergence and spreading of clones combining methicillin resistant and PVL toxin production can be controlled by improved vigilance and effectively manage the PVL related disease.

As per the scanty reports available on the prevalence of PVL gene related to S. aureus so the present study has been envisaged to know the prevalence of Staphylococcus aureus isolated from different sepsis cases from three different hospitals of Odisha.

**Material and Method**

**Study site:** The pus and blood samples of sepsis cases like accidental infection, burn, ulcers, gangrene, abscesses, skin and soft tissue infection (SSTI), surgical infection and septicemia were included. Samples from these cases were collected from the OPD and IPD of Capital Hospital, Bhubaneswar; District Headquarter hospital, Khurda and SCB Medical College and Hospital, Cuttack during March, 2015 to February, 2018. The inform consent were taken from patients/ their attendants before the collection of samples.

**Isolation and identification of S. aureus:** The samples were immediately inoculated on MacConkey agar, blood agar and nutrient agar (Hi Media, Mumbai) plates and incubated for 24hrs at 37°C. Incubation of blood agar plates were done in both aerobic and anaerobic conditions. Significant colonies showing beta hemolysis in blood agar plates were picked for gram’s staining and biochemical tests for confirmation. Identification of S. aureus isolates was done based on colony morphology and biochemical tests like catalase, coagulase test (slide and tube), etc. Pure isolates of S. aureus were further confirmed by manitol salt agar test and chromogenic agar media (Hi Media, Mumbai) which was used for the rapid detection of MRSA strains.

**Antimicrobial susceptibility:** The sensitivity and the resistance patterns of S. aureus strains were tested with antibiotic-impregnated commercial disks (Hi-Media, Mumbai, India) as per disc diffusion method. The antibiotics used were azithromycin (AZM,15µg), ampicillin (A,10µg), ciprofloxacin (CIP,5µg), chloramphenicol (C,30 µg), cefoxitin (CX,30µg), doxycycline (DO,30µg), gentamicin (G,10µg), oxacillin(OX,1µg), ofloxacin(OF,5µg), penicillin(P,10µg), tetracycline (T,30µg) and vancomycin (VA,30 µg).

**Molecular analysis:** The DNA was extracted from the selected S. aureus isolates for detection of virulence-associated genes (mec A and luk-PV gene). Primers used for mec A gene (985bp) was (5’-CGGTAACATTGATCGCAACG) and (3’- TTTGCCAACCTTACCATCG) as described earlier by Stegger, et al., (2012). Primers used for luk-PV gene (433bp) was (5’- ATCATTAGTAAATGTCTGCGATACCA) and (3’- GCATCAASTGTATGGATAGC AAAAGC) as described earlier by Lina, et al.,(1999) PCR mixture (25 μl) contained 5 μl of DNA template after extraction was amplified (PVL gene) for 30 cycles (30sec denaturation at 94°C, 60sec annealing at 57 ºC and 2min elongation at 72°C). The PCR products were visualized in gel documentation under UV trans-illuminator using 2% agarose gel with Ethidium bromide.

**Results**

A total of 530 S. aureus isolates from different clinical cases from Cuttack, Bhubaneswar and Khurda areas. Out of these PVL positive were 425 (80.2%) in MRSA strains and 105(19.8%) in MSSA strains. The mec A gene (985bp) and luk-PV (PVL) gene were detected by simplex PCR method (Fig-1). The mec A gene were detected in 70% of the selected isolates and luk-PV (PVL) gene were detected in 80% of the selected isolates. The majority of the PVL positive isolates were obtained from MRSA SSTI cases 153 (28.8%) and least were from blood infection cases (Table-1).

The maximum PVL positive Staphylococcus aureus infected cases (25.8%) were seen in age group 50-60years male patients. The least PVL positive cases (1.8%) were seen in female age group of 18-30years. (Table-2)

**Antibiogram profile:** The five hundred thirty PVL positive Staphylococcus aureus were resistant to most of the antibiotics as azithromycin, ampicillin, chloramphenicol, cefoxitin ciprofloxacin, doxycycline, gentamicin, oxacillin, ofloxacin, and tetracycline. Eighty percentages of the Staphylococcus aureus isolates were methicillin resistant S. aureus (MRSA) strains which were, resistant to oxacillin as per CLSI guidelines. (Table-3).
Table 1: Prevalence of selected PVL positive *Staphylococcus aureus* isolated from different septic cases (2015-2018)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Clinical cases</th>
<th>S. aureus</th>
<th>MRSA</th>
<th><em>mecA</em> positive</th>
<th>MRSA (PVL positive)</th>
<th>MSSA (PVL positive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accidental</td>
<td>30 (5.7%)</td>
<td>20 (3.7%)</td>
<td>20 (3.7%)</td>
<td>20 (3.7%)</td>
<td>6 (1.1%)</td>
</tr>
<tr>
<td>2</td>
<td>Burn</td>
<td>10 (1.9%)</td>
<td>8 (1.5%)</td>
<td>8 (1.5%)</td>
<td>4 (0.7%)</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Soft tissue Infection</td>
<td>200 (37.7%)</td>
<td>169 (31.8%)</td>
<td>149 (28.1%)</td>
<td>153 (28.8%)</td>
<td>20 (3.8%)</td>
</tr>
<tr>
<td>4</td>
<td>Abscess</td>
<td>69 (13.2%)</td>
<td>50 (9.4%)</td>
<td>49 (9.3%)</td>
<td>48 (9.1%)</td>
<td>12 (2.3%)</td>
</tr>
<tr>
<td>5</td>
<td>Ulcer</td>
<td>150 (28.3%)</td>
<td>120 (22.6%)</td>
<td>114 (21.5%)</td>
<td>118 (22.3%)</td>
<td>13 (2.5%)</td>
</tr>
<tr>
<td>6</td>
<td>Surgery</td>
<td>61 (11.5%)</td>
<td>50 (9.4%)</td>
<td>25 (4.7%)</td>
<td>28 (5.3%)</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Gangrene</td>
<td>3 (0.6%)</td>
<td>2 (0.4%)</td>
<td>1 (0.2%)</td>
<td>1 (0.2%)</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>Septicaemia</td>
<td>6 (1.1%)</td>
<td>6 (1.1%)</td>
<td>6 (1.1%)</td>
<td>1 (0.2%)</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>Total</td>
<td>530</td>
<td>425 (80.2%)</td>
<td>372 (70.2%)</td>
<td>373 (70.4%)</td>
<td>51 (9.6%)</td>
</tr>
</tbody>
</table>

Table 2: Age and sex distribution of PVL positive *S. aureus* cases

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>&gt;18 - &lt;30</td>
<td>45 (8.5%)</td>
</tr>
<tr>
<td>&gt;30- &lt;40</td>
<td>82 (15.5%)</td>
</tr>
<tr>
<td>&gt;40 - &lt;50</td>
<td>106 (20%)</td>
</tr>
<tr>
<td>&gt;50 - &lt;60</td>
<td>137 (25.8%)</td>
</tr>
<tr>
<td>Total</td>
<td>370 (69.8%)</td>
</tr>
</tbody>
</table>

Table 3: Resistance and sensitivity Profile (%) of selected PVL positive *S. aureus* to different antibiotics.

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Strain (MRSA n=425)</th>
<th>Resistant (%)</th>
<th>Sensitive (%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(MSSA n=105)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azithromycin</td>
<td>MRSA</td>
<td>65</td>
<td>35</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>MSSA</td>
<td>11</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>Penicillin</td>
<td>MRSA</td>
<td>97</td>
<td>3</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>MSSA</td>
<td>27.8</td>
<td>72.2</td>
<td></td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>MRSA</td>
<td>76.8</td>
<td>23.2</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>MSSA</td>
<td>33.3</td>
<td>66.7</td>
<td></td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>MRSA</td>
<td>59</td>
<td>41</td>
<td>0.00001</td>
</tr>
<tr>
<td></td>
<td>MSSA</td>
<td>27.8</td>
<td>72.2</td>
<td></td>
</tr>
<tr>
<td>Doxycycline</td>
<td>MRSA</td>
<td>31</td>
<td>69</td>
<td>0.000005</td>
</tr>
<tr>
<td></td>
<td>MSSA</td>
<td>5.5</td>
<td>94.5</td>
<td></td>
</tr>
</tbody>
</table>
**Table 3: Resistance and sensitivity Profile (%) of selected PVL positive *S. aureus* to different antibiotics.**

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>MRSA</th>
<th>MSSA</th>
<th>76</th>
<th>24</th>
<th>0.0000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>38.9</td>
<td>61.1</td>
<td></td>
</tr>
<tr>
<td>Ofloxacin</td>
<td>56</td>
<td>11</td>
<td>44</td>
<td>89</td>
<td>0.0000</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>19.9</td>
<td>0</td>
<td>80.1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Vancomycin</td>
<td>66</td>
<td>16.7</td>
<td>34</td>
<td>83.3</td>
<td>0.0000</td>
</tr>
<tr>
<td>Ampicillin</td>
<td>58.2</td>
<td>5.5</td>
<td>41.8</td>
<td>94.5</td>
<td>0.0000</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>1.9</td>
<td>0</td>
<td>80</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>80</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

MRSA and MSSA- methicillin resistant and sensitive *S. aureus*

(P<0.005 is Significant)

**Discussion**

Panton Valentine leukocidin increases the pathogenicity of *S. aureus* contributing to increase in morbidity and mortality rate. But the role of PVL in enhancing virulence of *S. aureus* and their pathogenicity is debatable as some studies have shown no association of PVL with the virulence of the organism. PVL is commonly used as a marker for differentiation of HA-MRSA and CA-MRSA which are now widespread in hospital settings and responsible for skin infection and other deep tissue infections. Diep et al., (2004) reported the association of PVL gene in skin and soft tissue infections caused by MRSA in San Francisco but the present findings revealed that *S. aureus* strains harbouring *pvl* gene (32.6%) was found in SSTI cases as well as abscesses, ulcers etc especially the community acquired infections and it was also found in MSSA strains.

Kaur et al.,(2012) from South India, have reported overall 62.85 % of PVL prevalence among MRSA and MSSA (MRSA:85.1 % and MSSA: 48.8 %) which indicates a higher prevalence among MRSA. D’Souza et al., (2010) from Mumbai reported prevalence of 64 % PVL positive isolates among MRSA strains. But in our study prevalence of 70.4 % PVL positive isolates among MRSA and 9.6% PVL positive isolates among MSSA
was observed. This variation in prevalence rate may be due to different geographical location and population. The infection rate as observed from our study was more frequent in male population than the female which was similar to the research carried out in a tertiary care hospital from south India. Most of the patients were male patients of age group 50-60 years, this could be justified as their immune system is weak and they are more prone to infection.

Over the past 2 decades, the incidences of both community-acquired and hospital-acquired \textit{S. aureus} infections have increased, while antibiotic treatment is increasingly hampered by the spread of \textit{S. aureus} strains that are resistant to multiple antibiotics, including methicillin. The results of antibiotic susceptibility testing revealed that both PVL negative MRSA and PVL positive MRSA isolates were resistant to most of the antibiotics except vancomycin. Similar results were reported from a south Indian hospital reported by Karthik, et al., (2016)

Global emergence and spread of MRSA remains a serious public health concern and challenge to clinicians and a number of different factors contribute to the pathogenicity and drug resistance of \textit{Staphylococcus aureus}. Research on PVL gene relating to manifestation to pathogenicity of \textit{S. aureus} strains isolated from different septic patients will be helpful for the treatment and management of septic patients in this region so the future study should be carried out involving more hospitals both from tribal and coastal areas of Odisha.

**Conclusion**

The present finding concludes that the more number of PVL positive MRSA strains were more detected in SSTI cases compared to other sepsis cases. The statistical significant PVL negative MRSA were showing higher MDR then PVL positive MRSA strains. As per the present findings the presence of PVL gene can be used as a reliable marker for CA-MRSA and CA-MSSA strains related to sepsis patients in this region.

**Acknowledgment:** We extend our sincere thanks to ICMR New Delhi for funding to carry out the research work. We are also grateful to the chief medical officers and the staffs of Capital Hospital, Bhubaneswar, District Headquarter Hospital, Khurda and SCB Medical College and Hospital, Cuttack for their kind cooperation and help during sample collection.

**Conflict of Interest:** No conflict of interest.

**Source of Funding:** ICMR New Delhi-SRF fellowship (No.80/889/2014-ECD-I)

**Ethical Clearance:** Provided

**References**


Does Serum Cotinine affects Lipid Profile?

Vaishali S. Pawar¹, Ajit Sontakke², Satish Kakade³, Jaywant Thorat⁴

¹Assistant Professor, Department of Biochemistry, ²Professor & HOD, Department of Biochemistry, Statistician
³Cum Associate Professor, Department of Community Medicine, ⁴Technician, Department of Biochemistry

Abstract

Introduction: Use of tobacco is causing major health problems including cardiovascular problems. Nicotine in tobacco has been attributed to changes in lipid profile. Cotinine is one of the nicotine metabolite.

Aim: To estimate serum cotinine (CTN) levels and serum lipid parameters in tobacco smokers and smokeless tobacco users and to compare them with tobacco nonusers.

Materials and Method: This cross sectional study was performed in 240 study subjects divided into 4 groups - tobacco smokers (G1), smokeless tobacco users (G2), dual tobacco smokers and smokeless tobacco users (G3), and tobacco nonusers (G4). G2 was divided into G2a, G2b, and G2c. Serum CTN levels were estimated using enzyme linked immunosorbant assay kit. Enzymatic methods with commercial kits were used to estimate serum lipid parameters- total cholesterol, triglycerides (TG) and high density lipid (HDL). Very low density lipid (VLDL) and low density lipid (LDL) were calculated with formula. Chi-square test, unpaired t test and ANOVA were used for statistical analysis.

Results: Total cholesterol, TG, VLDL & LDL were significantly high and HDL was significantly low in tobacco users than tobacco nonusers (P<0.05). LDL is significantly high in tobacco chewers than smokers (P<0.05). A significant association was found between raised mean serum CTN levels and low HDL (P=0.019), also with raised total cholesterol, TG, VLDL and LDL (p<0.001). Total cholesterol, TG and VLDL were significantly increasing with duration and amount of tobacco use.

Conclusion: Tobacco users with longer duration of tobacco use with increased levels of serum cotinine have deranged lipid profile which can be a risk factor for cardiovascular diseases. Not only smoking but tobacco chewing also affects lipid profile.

Keywords: Serum cotinine, lipid profile, tobacco smokers, smokeless tobacco users.

Introduction

Tobacco use has become a major public as well as social health problem all over the world. Tobacco use is an avoidable cause of many diseases like cardiovascular diseases, chronic obstructive pulmonary disease, cancers, oral diseases etc. According to Global Adult Tobacco Survey India 2009-2010, prevalence of smokeless tobacco use (26%) is significantly more than that of smoking (14%).

Corresponding author:
Dr. Vaishali S. Pawar
Assistant Professor, Krishna Institute of Medical Sciences, Karad, Maharashtra, India

Tobacco contains more than 4,200 chemicals. Nicotine is an important alkaloid and major addicting substance in tobacco. Nicotine is regarded as responsible factor for most of the adverse effects of tobacco use. It is evident that nicotine has great impact on blood lipid levels.

Modification in lipid metabolism caused by pharmacological properties of nicotine and other constituents of tobacco leads to dyslipidemia which may act as a disposing factor for cardiovascular diseases (CVD). This eventually leads to increased morbidity and mortality in tobacco users. CVD are multi-factorial. A strong combined interaction exists between hypercholesterolemia, tobacco consumption and other risk factors.
factors in causation of CVD. Tobacco use leads to a high burden of early death and disability in India as compared to other countries.

The possible mechanisms of tobacco use in pathogenesis of CVD are-

Smoking causes endothelial dysfunction and platelet activation leading to a prothrombotic state.

Carbon monoxide induced atherogenesis.

Nicotine increases catecholamine and cortisol secretion that can alter carbohydrate and lipid metabolism.

Near about 70 to 80 % of nicotine is rapidly metabolized to CTN in the liver. CTN has a longer half-life of 18-20 hours and can be reliably estimated in blood, saliva and urine. Blood CTN is regarded as sensitive, direct and best marker for monitoring tobacco exposure in actively exposed individuals.

Presently, there is limited evidence relating smokeless tobacco use and CVD. Also, very few studies have been done in India regarding effect of smoking, smokeless tobacco use, dual use of smokeless tobacco and smoked tobacco on lipid profile. Hence, in this study we estimated serum cotinine as marker of tobacco exposure and serum lipid profile in tobacco smokers and smokeless tobacco users and compared them with tobacco nonusers.

**Material and Method**

**Study design**

This was a cross sectional study, conducted on subjects attending Ophthalmology OPD, Krishna Hospital, Karad, Maharashtra from January 2016 to December 2017.

**Ethics**

Ethical clearance was taken from Institutional Ethics Committee. Informed written consent was taken from every subject.

**Methodology:**

Based on the previous study done by Srivastava et al, sample size was calculated as follows: to obtain mean difference in serum total cholesterol level of 52.76 miligram per decilitre (mg/dl) (200.88± 15.63 mg/dl vs 148.12 ±16.22 mg/dl) among smokeless tobacco users and tobacco nonusers with permissible error 10%, confidence interval 95%, power 80% it come around minimum 10 in each group. Open Epi, version 3, open source calculator was used.

Hence, in each group 60 subjects were included with total 240 subjects in the following four groups.

Group 1(G1) - 60 tobacco smokers

Group 2(G2) - 60 smokeless tobacco users

G2a -20 tobacco chewers

G2b- 20 tobacco mishri users

G2c- 20 dual, tobacco chewers and tobacco mishri users

Group 3(G3) - 60 dual, tobacco smokers and smokeless tobacco users

Group 4(G4) - 60 tobacco nonusers

**Inclusion and Exclusion criteria**

**Inclusion criteria:** age between 35-60 years

Group 1 included smokers (an adult who has smoked 100 cigarettes or bidis in his or her lifetime and who currently smokes)

Group 2 included smokeless tobacco users (smokeless tobacco user was defined as ever using a smokeless tobacco product once within the past 30 days).

Group 3 included dual, tobacco smokers and smokeless tobacco users

Group 4 included subjects who never used tobacco

**Exclusion criteria**

Individuals with associated systemic illness like hypertension, diabetes mellitus, liver, cardiac or renal diseases, pregnancy and history of any other substance abuse (alcohol, drugs).

Subjects taking regular medications which can affect serum lipid profile level.

Subjects were selected by systematic sampling method. According to inclusion & exclusion criteria and four groups, subjects were selected from the patients coming to OPD. According to the group, every third
A proforma was filled for every subject containing demographic data, past history of tobacco use and medical history. Questionnaire was used to collect details of tobacco use.

In tobacco users, amount of tobacco use in grams per day calculated as follows: subjects were asked on an average how many packets of biddies / cigarettes/ chewing tobacco / mishri they used per day. To calculate how much tobacco each subject consumed, tobacco content \(^{12}\) in each tobacco products was multiplied by number of packets consumed per day.

**Biochemical investigation**

After overnight fasting, 10 ml of venous blood sample was collected in plain bulb with aseptic precautions from all the subjects. Blood was processed in Biochemistry laboratory of KIMSU, Karad. Serum was separated by centrifugation. Serum CTN level was measured by cotinine enzyme linked immunosorbant assay kit (Calbiotech). \(^{13}\)

Serum lipid profile was estimated by using analytical kit. Estimation of total cholesterol by CHOD-PAP method, TG by GPO-PAP method, HDL by Phosphotungstic acid method was done using EM360 Transasia automatically. \(^{14}\), LDL, VLDL were calculated by Fried-Wield’s formula. VLDL= TG/5, LDL=Total cholesterol-HDL-VLDL.

The reference range of serum lipid profile was taken as total cholesterol 150-200 mg/dl, TG 50-150 mg/dl, HDL 40-60 mg/dl, LDL 60-130 mg/dl, and VLDL 10-30 mg/dl. Derangement criteria for lipid profile values was taken as total cholesterol >200 mg/dl, TG >150 mg/dl, HDL< 40 mg/dl, LDL >130 mg/dl, and VLDL <30 mg/ dl.

**Statistical analysis**

Chi-square test, unpaired t test and ANOVA have been used. The data analyzed using IBM SPSS Statistics, version 20. P value <0.05 was considered as statistically significant.

**Results**

On comparison of the mean values of serum lipid parameters between the groups, they were found statistically significant (P<0.001). Total cholesterol, TG, VLDL & LDL were significantly high and HDL was significantly low in tobacco users than tobacco nonusers (P<0.05). In tobacco users, Total cholesterol, TG, VLDL & LDL were significantly high in G1, G2a, G2c and G3 than G2b (P<0.05). LDL is significantly high in G2a than G1 (P<0.05). [Table 1]

**Table 1: Comparison of lipid parameters between the study groups**

<table>
<thead>
<tr>
<th></th>
<th>Lipid parameters (mean ± SD)mg/dl</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Cholesterol</td>
</tr>
<tr>
<td>G1</td>
<td>203.11±25.0</td>
</tr>
<tr>
<td>G2</td>
<td>G2a</td>
</tr>
<tr>
<td></td>
<td>G2b</td>
</tr>
<tr>
<td></td>
<td>G2c</td>
</tr>
<tr>
<td>G3</td>
<td>209.58±28.5</td>
</tr>
<tr>
<td>G4</td>
<td>155.05±22.9</td>
</tr>
<tr>
<td>ANOVA</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>P</td>
</tr>
</tbody>
</table>
In tobacco users, a significant association between increased serum cotinine levels with increased Total cholesterol (P<0.001), TG (P=0.006), VLDL (P<0.001) LDL (P<0.001) and decreased HDL (P=0.019) was observed. [Table 2]

Table 2: Association of serum cotinine levels with lipid parameters in tobacco users

<table>
<thead>
<tr>
<th>Lipid parameter</th>
<th>mg/dl</th>
<th>Serum cotinine (mean±SD)ng/ml</th>
<th>t</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol</td>
<td>≤200</td>
<td>93.12±20.35</td>
<td>12.22</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>&gt;200</td>
<td>162.63±53.09</td>
<td>12.22</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TG ≤150</td>
<td>107.81±38.67</td>
<td>2.77</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>&gt;150</td>
<td>129.58±54.89</td>
<td>2.77</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>VLDL ≤30</td>
<td>101.15±34.52</td>
<td>3.85</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>&gt;30</td>
<td>131.54±54.24</td>
<td>3.85</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>LDL ≤130</td>
<td>99.40±26.92</td>
<td>10.06</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>&gt;130</td>
<td>163.20±57.98</td>
<td>10.06</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>HDL ≤40</td>
<td>103.95±52.24</td>
<td>2.37</td>
<td>0.019</td>
<td></td>
</tr>
<tr>
<td>&gt;40</td>
<td>83.52±76.48</td>
<td>2.37</td>
<td>0.019</td>
<td></td>
</tr>
</tbody>
</table>

In tobacco users, Total cholesterol and TG levels were increasing with increase in duration of tobacco use (P=0.049, P=0.043 respectively). Even though VLDL & LDL were increasing and HDL was decreasing with duration of tobacco use, it was not statistically significant. [Table 4]

Table 3: Comparison of lipid parameters with duration of tobacco use in tobacco users

<table>
<thead>
<tr>
<th>Lipid parameters (mg/dl)</th>
<th>Duration of tobacco use in years</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(mean±SD)</td>
<td>0-14</td>
<td>15-30</td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>193.52±32.90</td>
<td>202.07±28.71</td>
</tr>
<tr>
<td>TG</td>
<td>157.52±53.54</td>
<td>179.61±50.64</td>
</tr>
<tr>
<td>VLDL</td>
<td>31.42±10.88</td>
<td>37.24±12.61</td>
</tr>
<tr>
<td>LDL</td>
<td>114.5±34.49</td>
<td>115.13±33.55</td>
</tr>
<tr>
<td>HDL</td>
<td>39.64±11.70</td>
<td>38.33±10.79</td>
</tr>
</tbody>
</table>

Mean serum Total cholesterol, TG, VLDL and LDL were significantly high in subjects using > 5 grams of tobacco per day than those using ≤ 5 grams ( P<0.001,P= 0.005, P<0.001,P <0.001 respectively). Mean serum HDL was low in subjects using > 5 grams of tobacco per day than those using ≤ 5 grams, but not statistically significant (P= 0.682). [Table 4]
Table 4: Comparison of lipid parameters with amount of tobacco use in grams/day

<table>
<thead>
<tr>
<th>Lipid parameter (mg/dl) (mean±SD)</th>
<th>Amount of tobacco use in grams/day</th>
<th>t</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 5 grams</td>
<td>&gt; 5 grams</td>
<td></td>
</tr>
<tr>
<td>Total cholesterol</td>
<td>186.30±20.31</td>
<td>235.81±17.67</td>
<td>15.64</td>
</tr>
<tr>
<td>TG</td>
<td>167.96±53.86</td>
<td>192.01±50.13</td>
<td>2.81</td>
</tr>
<tr>
<td>VLDL</td>
<td>33.60±10.85</td>
<td>44.32±18.52</td>
<td>4.85</td>
</tr>
<tr>
<td>LDL</td>
<td>105.60±23.20</td>
<td>138.76±40.49</td>
<td>6.93</td>
</tr>
<tr>
<td>HDL</td>
<td>38.57±10.89</td>
<td>37.85±10.80</td>
<td>0.41</td>
</tr>
</tbody>
</table>

**Discussion**

When we come across the various types of lipoproteins, it is the level of LDL that is most directly associated with coronary heart disease (CHD). VLDL has been shown to be associated with premature atherosclerosis; HDL is protective against the development of CHD. 

Our study showed that Total cholesterol, TG, VLDL & LDL were significantly high and HDL was significantly low in tobacco users than tobacco nonusers. Similar findings were seen in study by Srivastava et al in smokeless tobacco users. Also similar findings observed by Khurana et al and Rao et al in smokers and tobacco chewers than tobacco nonusers. This could be explained by significantly higher CTN levels in tobacco users compared with tobacco nonusers as found in our previous study.

On the other hand, Siegel et al study of healthy players with smokeless tobacco use demonstrated no significant differences in Total cholesterol, LDL & HDL levels compared with nonusers.

In tobacco users, Total cholesterol, TG, VLDL & LDL were significantly low in tobacco mishri users than other tobacco users. This could be due to low serum CTN level in tobacco mishri users as proved by our previous study. LDL is significantly high in tobacco chewers than smokers. The differences in levels of other lipid parameters in other tobacco users were not statistically significant. Similarly, Khurana et al observed that the differences in levels of lipid parameters in smokers and tobacco chewers were not statistically significant.

Tucker et al observed that cigarette smokers did not differ significantly from users of smokeless tobacco regarding hypercholesterolemia. There was substantial proportion of hypercholesterolemia among smokeless tobacco users. From these findings, it is obvious that the consequences of using smokeless tobacco may reach beyond the oral cavity.

Gadpal et al observed that on comparison between tobacco chewers and smokers, mean TG and mean VLDL level were non-significant. Mean Total cholesterol, LDL & HDL were significantly high in smokers than tobacco chewers.

In tobacco users, a significant association between increased mean serum cotinine levels with deranged lipid profile was observed. Similar findings were present in study by Srivastava et al.

Significant increase in Total cholesterol and TG levels was found with increase in duration of tobacco use. VLDL & LDL were increasing and HDL was decreasing with duration of tobacco use. Similarly Haragopal et al observed significant increase in Total cholesterol and LDL in long term tobacco users compared with non-users and short-term users. This could be explained as due to long term effects of sustained blood nicotine levels.

Derangement of lipid profile was significantly high in subjects using > 5 grams of tobacco per day. Dyslipidemia in the form of increased TG, LDL & VLDL
along with decreased HDL is associated with occurrence of atherosclerotic lesions in vascular endothelium. A large amount of nicotine is absorbed into the blood as smokeless tobacco remains in contact of buccal mucosa for a longer duration also through gastrointestinal tract. Whereas, nicotine absorption is primarily by pulmonary blood vessels during smoking. A number of factors like pH value, nicotine concentration of the product etc. determine the amount of nicotine absorption and speed of transfer across the oral mucosa.

The finding suggests that smoking as well as tobacco chewing affects lipid profile due to increased levels of serum cotinine. Therefore, tobacco users should be counseled regarding health hazards due to tobacco use and encouraged to give up tobacco and adopt healthy lifestyle to reduce the risk of developing health related problems.

Limitations

Being a cross sectional study, we cannot assess the correlation of deranged lipid profile and CVD, so a longitudinal study is needed. Also we did not have exact information on amount of tobacco used per day, which is approximately calculated from number of packets used per day.

Conclusion

Tobacco users with longer duration of tobacco use with increased levels of serum cotinine have deranged lipid profile which can be a risk factor for cardiovascular diseases. Not only smoking but tobacco chewing also affects lipid profile. So emphasis should be given to educate people on ill effects of smokeless tobacco as well.

Acknowledgement: We thank KIMS, deemed to be University, Karad for funding the study.

Conflicts of Interest: No conflict of interest is associated with the work.

References


Betatrophin: It’s Impact on Lipid Profile in Type two Iraqi Obese Diabetic Women

Raghd A.Y. Alkhader¹, Khitam abdul-wahhab Ali¹, Abbas Mahdi Rahmah Al-Kharasani²

¹College of Medicine-Department of Chemistry and Biochemistry, Mustansiriyah University, Baghdad, ²National Diabetes Center– Mustansiriyah University, Baghdad

Abstract

Background: Betatrophin, have been identified as hormone produced in adipose tissue and liver, and involved in regulating of lipid metabolism and glucose homeostasis.

Aim: To evaluate serum betatrophin levels in type 2 obese diabetic women and compare these levels with obese non-diabetic women, and to investigate the relationship between betatrophin levels with fasting blood glucose and lipid profile levels.

Method: The case-control study was included obese women with type 2 diabetic and non-diabetic (n=44 each) of same age and BMI. Serum betatrophin, fasting blood glucose (FBG), total cholesterol, triglycerides and high-density lipoprotein-cholesterol (HDL-C) were measured from all individuals. Low-density lipoprotein-cholesterol (LDL-C) and very-low-density lipoprotein (VLDL-C) were calculated according to the (Friedewald formula).

Results: Serum betatrophin levels were higher (P<0.001) in type-2 obese diabetic women when compared to obese non-diabetic control, and there was a significant positive correlation (r = 0.332, P = 0.028) between serum betatrophin levels and fasting blood sugar levels. According to Receiver Operating Characteristic curve, betatrophin suitable for distinguishing between type-2 obese diabetic women from obese non-diabetic women (AUC = 0.820, p<0.0001).

Conclusion: Betatrophin hormone showed a highly significant elevated level in type-2 obese diabetic women compare to non-diabetic obese women. The findings of this study established betatrophin a good marker, suitable for distinguishing T2DM women from those without this condition.

Keywords: Type 2 diabetes, Betatrophin, Obesity.

Introduction

Type 2 diabetes mellitus (T2DM) is the most prominently growing chronic disease chiefly resulting from an impairment in both insulin secretion, and insulin action. T2DM, encompasses subjects who have insulin resistance (IR) and insulin deficiency. It is the most common, form of diabetes mellitus; it is not only insidious in onset but also asymptomatic.

Obesity can be generally defined as, an excess amount of body fat, it is a major risk factor for T2DM. Importantly, T2DM is strongly linked to obesity in both sexes and all racial/ethnic groups. It has been estimated that about 80% of T2DM subjects are obese; explaining the close association of adiposity, with IR and justifying the term “Diabesity” from diabetes and obesity.

Betatrophin, is a bioactive peptide hormone, generally encoded by Gm6484 gene in mouse liver and fat. Moreover, betatrophin is mainly expressed in the human’s liver and is encoded by C19orf80 gene. Melton et al. (2013) identified a hormone, ANGPTL8, which they called “betatrophin” and highlighted the role of this
hormone as a regulator in proliferation of the pancreatic β cells. Betatrophin also designated as “Hepatocellular Carcinoma-Associated Gene TD26” TD26, RIFL, ANGPTL8, and Lipasin.

Betatrophin was also named angiopoietin-like 8 (ANGPTL8), as it shares a significant sequence-similarity, with the angiopoietin-like (ANGPTL) protein family, specifically angiopoietin-like 3 (ANGPTL3). Betatrophin /ANGPTL8 is a member of ANGPTLs family, that the (ANGPTL1 to ANGPTL7) have a very similar structure that is made up of a carboxy-terminal (fibrinogen-like) domain, connected with an amino-terminal domain (coiled-coil) by a linker region. ANGPTL8, unlike ANGPTLs family, it possesses only the (coiled-coil domain).

Both in-vitro and in-vivo studies, have been suggested that Betatrophin/ANGPTL8 acts to inhibit lipoprotein lipase (LPL). Thus, in the Angptl8 knockout mice, low TG phenotype is probably caused by increasing in the activity of LPL. Lipoprotein lipase is the rate-limiting enzyme, for hydrolysing the core TG presenting in the circulating lipoproteins, liberating FFA that are generally taken up by cardiomyocytes and adipocytes to be either oxidized or stored.

The discovery of betatrophin/ANGPTL8, as a hormone has the capacity to increase the proliferation of β-cell was hailed as, a scientific breakthrough. It was shown that betatrophin/ANGPTL8 has been increased under the IR states to increase the proliferation of β-cell and the production of insulin. Betatrophin (ANGPTL8) was increased in ob/ob (obese) mouse model, and in the db/db (diabetes type II) mice. The ability to induce the proliferation of the pancreatic β-cell was promising in the DM therapy; nevertheless, this result was irreproducible and “could not be confirmed by further studies”, so beta cell proliferation by betatrophin/ANGPTL8 was invalidated.

The aim of the study is to evaluate role of serum betatrophin levels in type 2 obese diabetic women and compare with obese non-diabetic women, as well as to investigate the relationship of betatrophin levels with FBS and lipid profile values.

Subjects, Materials and Method

This case-control study was conducted at College of Medicine, Mustansiriyah University, Baghdad, Iraq in collaboration with the National Diabetes Center during the period from December 2017 to April 2018.

Eighty-eight subjects were included: type 2 obese diabetic Iraqi women as (patients group, n=44) and obese non-diabetic women as (control group, n=44). They were comparable in age and BMI. All T2DM patients were diagnosed by physicians and measurement the fasting blood glucose levels, according to the ADA, and WHO criteria. Obesity is defined as a BMI of 30 kg/m² and above. Patients with type-1 diabetes, gestational diabetes; concurrent renal disease, liver disease or thyroid dysfunction; lactating women, smoker, alcohol drinker; and patients on hypolipidemic drugs, such as statins were excluded from this study.

After an overnight’s fasting, blood were collected from each patient and control subject at time (8.30-10.30 am). The serum was separated and stored at −20°C till further use. Serum of human betatrophin was measured by Enzyme-linked immunosorbent (ELISA) assay. Serum fasting blood glucose (FBG) and Serum total cholesterol, triglycerides, high-density lipoprotein-cholesterol (HDL-C), were measured by KENZA 240TX/ISE Automatic biochemistry analyser. Low-density lipoprotein-cholesterol (LDL-C), and very-low-density lipoprotein (VLDL-C) were calculated according to the (Friedewald formula). Body Mass Index (BMI) was calculated by using the following equation.

\[
BMI = \frac{\text{weight (Kg)}}{\text{square height (m}^2)}
\]

Medical history regarding the age, duration of DM, as well as history of the other illness, were recorded from the patients, and their medical records were reviewed.

Statistical Analysis

The Analysis of data was performed using the available Statistical Packages for Social Sciences version 24. Data were presented in mean±standard deviation (SD). The statistical significance of difference of [quantitative data] were tested by using (Students-t-test) for difference between 2 independent means, or (ANOVA test) for difference in means among more than 2 independent groups. The P value ≤0.05 was considered significant. The Pearson’s correlation was calculated to determine the correlation between 2 quantitative variables, with its t-test for testing significance of the correlation. The Receiver Operating Characteristic (ROC) curve analysis was used for determining the use
of any parameter as a diagnostic or screening tool for disease, and to determine the “cut-off value” which of optimum sensitivity and specificity to diagnose disease.

Results

The clinical and the biochemical characteristics of study subjects, are shown in Table 1. Mean value of serum FBG in type 2 obese diabetic women 173.00±52.24 mg/dL was increased (P<0.0001) compared to mean serum FBS in obese non-diabetic controls (84.30±7.32 mg/dL). Data in Table 1 demonstrated the mean value of serum betatrophin in type 2 obese diabetic women 1167.35±420.42 pg/ml which was higher (P<0.0001) compared with mean serum betatrophin levels in obese non-diabetic women 724.14±278.9 pg/ml.

Table 1. The clinical and the biochemical characteristics of study subjects

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T2DM (n=44)</th>
<th>Control (n=44)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>48.7±6.6</td>
<td>45.8±7.1</td>
<td>0.413</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>80.89±11.73</td>
<td>83.39±15.3</td>
<td>0.392</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>157.32±6.93</td>
<td>159.84±5.35</td>
<td>0.059</td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>33.97±3.70</td>
<td>33.81±2.22</td>
<td>0.810</td>
</tr>
<tr>
<td>FBS (mg/dL)</td>
<td>173.00±52.24</td>
<td>84.30±7.32</td>
<td>0.0001*</td>
</tr>
<tr>
<td>TC (mg/dL)</td>
<td>209.59±25.48</td>
<td>174.11±33.56</td>
<td>0.0001*</td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>180.70±41.59</td>
<td>100.55±31.25</td>
<td>0.0001*</td>
</tr>
<tr>
<td>LDL (mg/dL)</td>
<td>129.66±27.96</td>
<td>105.61±29.73</td>
<td>0.0001*</td>
</tr>
<tr>
<td>VLDL (mg/dL)</td>
<td>36.23±8.32</td>
<td>20.02±6.34</td>
<td>0.0001*</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>43.70±11.80</td>
<td>48.41±10.69</td>
<td>0.053</td>
</tr>
<tr>
<td>Betatrophin (pg/ml)</td>
<td>1167.35±420.42</td>
<td>724.14±278.9</td>
<td>0.0001*</td>
</tr>
</tbody>
</table>

*Significant difference at (0.05 level)

BMI: body mass index, FBS: fasting blood sugar; TC: Total Cholesterol, TG: Triglycerides, HDL: high density lipoprotein cholesterol, LDL: low density lipoprotein cholesterol, VLDL: very low density lipoprotein cholesterol.

Results in Table 2 predicted that type 2 obese diabetic women showed a positive correlation between serum betatrophin and fasting blood sugar (r = 0.332, P = 0.028). The results showed that no correlation between betatrophin levels and mean value of BMI, age and lipid profile.

Table 2: Correlation between serum betatrophin levels and studied variations in Type 2 obese diabetic women

<table>
<thead>
<tr>
<th>Parameters</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>0.071</td>
<td>0.645</td>
</tr>
<tr>
<td>Weight (Kg)</td>
<td>-0.036</td>
<td>0.815</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>0.114</td>
<td>0.461</td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>-0.120</td>
<td>0.438</td>
</tr>
<tr>
<td>FBS (mg/dL)</td>
<td>0.332*</td>
<td>0.028</td>
</tr>
<tr>
<td>TC (mg/dL)</td>
<td>-0.273</td>
<td>0.073</td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>0.002</td>
<td>0.989</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>-0.177</td>
<td>0.250</td>
</tr>
<tr>
<td>LDL (mg/dL)</td>
<td>-0.177</td>
<td>0.249</td>
</tr>
<tr>
<td>VLDL (mg/dL)</td>
<td>0.012</td>
<td>0.937</td>
</tr>
</tbody>
</table>

*Significant difference at (0.05 level)
The Receiver Operating Characteristics (ROC) analysis for serum betatrophin, when used as a test to diagnosis subjects into cases and control groups, showed the area-under-the-curve (AUC) of serum betatrophin was 0.820 (p<0.0001), the optimum cut-off value for serum betatrophin 921.5 pg/ml with sensitivity 77.3 and specificity 79.5 are shown in Figure 1.

Figure 1: Receiver Operating Characteristics analysis for determining the cut-off value of Betatrophin in distinguishing obese T2DM from control women.

The optimum cut-off value for serum betatrophin (921.5) with sensitivity (77.3) and specificity (79.5).

Discussion

Betatrophin, was identified as hormone which produced in adipose tissue and the liver, and involved in regulating both lipid metabolism and glucose homeostasis. Circulating betatrophin/ANGPTL8 levels are altered in different metabolic disorders, even though many of these results are inconsistent.

Betatrophin levels were highly significant elevated in type 2 obese diabetic women in comparison to controls (Table 1). This finding is in agreement with Al-Daghri et al. who found that betatrophin/ ANGPTL8 circulating levels were significantly elevated in T2DM patients in comparison to controls. In addition, they predicted that higher demands for insulin in T2DM condition as a result of IR, can cause an increased in the production of betatrophin/ ANGPTL8.

Previous reports showed that betatrophin levels were decreased; or even unchanged in diabetic patients. Both of these results were inconsistent with the present results, in addition with results obtained by Yamada et al. Espes et al. demonstrate that circulating betatrophin concentrations were significantly elevated in long standing (type-1 DM) subjects when compared to healthy controls. Fu et al. suggested that this conflicting of results was primarily due to the differences between (EIA/ELISA kits) with reactivity to the (N-terminus or C-terminus) of betatrophin/ ANGPTL8 or because of ethnic differences.

Our findings are accoedance with previous reports. Al-Rawashdeh et al. who found that plasma concentrations of betatrophin were elevated in metabolic syndrome (pre/T2DM subjects in comparison to MS-control subjects. In this study, according to type 2 obese diabetic women the results found that there was a positive correlation between mean serum betatrophin levels and fasting blood sugar levels. Fu et al. who predicted a positive correlation between circulating betatrophin level and fasting glucose.

Extensive research on betatrophin has produced evidence that, via a transcription factor referred to as (ChREBP) “Carbohydrate-responsive element-binding protein”, glucose controls the expression of numerous genes, involved in carbohydrate homeostasis. This glucose stimulated transcription factor regulates the gene expression, by binding to specific consensus sequences in the promoter region of gene which called “carbohydrate responsive elements” (ChRE). In this regard, betatrophin / ANGPTL8 was revealed to have a ChREBP binding site (from -398 to -382) in its promoter region. It has additionally been indicated that in hepatoma (HepG2) cells, ChREBP actually binds to the betatrophin/ANGPTL8 promoter. Hence, taking into account these points a positive correlation between FBS with betatrophin/ANGPTL8 in T2DM, is expected.

Regarding serum betatrophin levels, the results showed that no correlation between betatrophin levels and mean value of BMI and age. Several previous reports have indicated that betatrophin circulating levels was increased in the patients suffering from diabetes, but without the positive correlation with mean BMI. The results of the present study were agreed with these results and showed no correlation between betatrophin and mean BMI.
Conclusion

The results regarding this study, support role of betatrophin in type-2 obese diabetic women, and suggesting that betatrophin, was an important hormone for regulation of the glucose level in type-2 DM. This hormone showed a highly significant elevated level in type-2 obese diabetic women compared to non-diabetic obese women. There was a significant positive correlation between serum betatrophin and fasting blood sugar. Assessment of circulating levels of betatrophin could be a useful diagnostic biomarker for distinguishing type-2 diabetic women from those without this condition. Future studies are needed in order to investigate the probabilities of this hormone (betatrophin) which may serve as potential therapeutic target in type-2 DM and obesity.

Ethical Clearance: A written consent was applied by each patient, and this study was approved by “The Scientific Committee of College of Medicine, Mustansiriyah University”.

Source of Funding: Self

Conflict of Interest: Nil

References


Interaction Between Tobacco Consumption, BMI and Diabetes

T Manigandan¹, S Kisore Kumar², A Julius³

¹Research Scholar, Professor, ²Asst.Director, R&D, BIHER Professor, Department of Orthodontics,³Professor& Head, Department of Biochemistry, Sree Balaji Dental College and Hospital, BIHER, Chennai.

Abstract

There is a wide consumption of tobacco in various forms, worldwide. It is well implied from many researches that tobacco has many delirious effects on oral as well as general health. Tobacco has a direct effect on oral cavity which varies from stains to malignancies. It is well known that tobacco has many indirect influence on many body parameters like BMI and it also contributes to many systemic morbidities. This reviews details the interaction between tobacco usage and its effect on BMI & Diabetes. It is inferred that proper health education through tobacco cessation counselling not only reduces the ill-effects of smoking in oral health but also contributes in improving general health.

Keywords: Tobacco, BMI, Diabetes

Introduction

Tobacco use is one among the five greatest risk factors for mortality, and also the single most preventable cause of death. In India, tobacco consumption is a major risk factor responsible for oral and oropharyngeal cancer. India has one of the highest rates of oral cancer in the world, partly attributed to the high prevalence of tobacco chewing habits.¹

India is the second largest consumer of tobacco in the world. The prevalence of all types of tobacco use among men has been reported to be high in most parts of the country (generally exceeding 50%). Further, a national level survey on tobacco use in India has reported that 16.2% are current smokers and 20.5% are tobacco chewers. This survey also showed that beedi is the most popular form of tobacco smoking, followed by cigarette smoking similarly, pan with tobacco is the major chewing form of tobacco.²,³

World Health Organization (WHO) estimates in 2004 projected 58.8 million deaths to occur globally, of which 5.4 million are attributed to tobacco use. As of 2002, 70% of the deaths are in developing countries. It is predicted that 1.5–1.9 billion people will be smokers in 2025.⁴,⁵

Body habitus, as described by BMI, is related to skeletal size, muscle mass, and adiposity. As such, it is influenced by diet, other aspects of lifestyle, and other environmental factors. The association between low BMI and smoking is well documented.⁶,⁷ The high prevalence of tobacco use and its association with low BMI raises important questions about its impact on public health in India, a country which has a high prevalence of low BMI among adults.

Various studies have proved as smoking increased, the rate of diabetes increased for both men and women. A dose response relationship seems likely between smoking and incidence of diabetes. The focus of this paper is to provide a more detailed analysis of the relation between different forms of Tobacco use and BMI and Diabetes and discuss the public health implications of these associations.
Tobacco Usage:

Within countries the prevalence of tobacco use is highest amongst people of low educational background and among the poor and marginalized. In several developing countries there have been sharp increases in tobacco use especially among men and as the tobacco industry continues to target youth and women there are also concerns about rising prevalence rates in these groups. The shift in the global pattern of tobacco use is reflected in the changing burden of disease and tobacco deaths. Tobacco use is a major preventable cause of premature death and also a common risk factor to several general chronic diseases and oral diseases. The negative impact relates not only to smoking but use of smokeless tobacco. In addition to smoking tobacco smokeless tobacco is widely used in a number of countries of the world depending on socio-cultural conditions.

Chewing tobacco is known as plug, loose leaf and twist. Pan masala or betel quid consists of tobacco, areca nuts and staked lime wrapped in a betel leaf. They can also contain other sweeteners and flavouring agents. Moist snuff is taken orally while dry snuff is powdered tobacco that is mostly inhaled through the nose. In comparison to smoking habits, the patterns of use of smokeless tobacco are less documented, particularly in developing countries.

Tobacco and BMI:

Body mass index (BMI) can be computed from height and weight using the formula: (Weight in pounds $\times$ 703) $\div$ Height$^2$ (in inches). BMI has been shown to adequately describe levels of body fat as well as measure overall physical health. Previous research has suggested that the reason for the positive association between cigarette use and BMI may be due to poor behavioral habits. In addition, found that smoking was positively associated with physical inactivity.

Numerous studies have confirmed that smokers do have a lower body mass index (BMI) than non-smokers. Nicotine, whether smoked, used orally or as patches is the major appetite-suppressing component of tobacco. Research into the effects of nicotine on the appetite-regulating regions of the hypothalamus further confirms the contribution it makes to reduced appetite and body weight loss. There is also evidence that nicotine’s effect on the metabolism lowers the body weight set point (normal body weight) and this may account for the initial weight gain experienced by some people when they give up smoking. However, there is evidence that cigarettes smoked per day are positively associated with central fat accumulation, particularly in women. Intra-abdominal accumulation of body fat may confer a higher risk of developing diabetes, cardiovascular disease and death, independently of general obesity. There is also some evidence that heavy smokers have greater bodyweight than light or non-smokers, perhaps because heavy smokers also make other unhealthy lifestyle choices.

Tobacco and Diabetes:

Several plausible biological mechanisms have been advanced to explain an association between cigarette smoking and incidence of diabetes, but more research is needed in this area. Some investigators have suggested that cigarette smoking generally increases insulin resistance by altering the distribution of body fat or by exerting a direct toxic on pancreatic tissues. Another mechanism that may be advanced parallels that proposed to explain how physical inactivity and obesity increase risk for diabetes; the transport of glucose into fat and skeletal muscle cells is impaired. In case of smoking, a chemical component of cigarettes may directly alter intracellular glucose transport, or may indirectly alter it through change in serum chemistry, or diminished vascular blood flow. As cigarettes contain 3500 different compounds in the particular phase and 500 gaseous compounds in the volatile phase, precisely elucidating such mechanism may be a formidable task indeed.

Various prospective epidemiological studies of diabetes incidence have included smoking as a possible risk factor. This positive relationship between cigarettes smoked and diabetes incidence has been noted in two prospective studies. In comparison among the men who smoked that much with the non-smokers, the rate of diabetes were four times as high in the Zutphen study.

Discussion

The effects of tobacco use on the incidence of certain diseases, particularly cancers of the aerodigestive tract and urinary bladder are well documented. But there are very few studies who related the effect of tobacco usage on BMI and diabetes. Most of the documented prospective studies have mentioned the low BMI (proxy of nutritional status), suggest a strong need
for further research on as tobacco use may have even more far-reaching public health implications in India than previously thought. There appears to be a strong relationship between smoking habits, lifestyle factors, and BMI and there may also be a relationship between the number of cigarettes smoked per day and BMI, where the BMI of never-smokers and heavy smokers appears similar. If the association is evaluated as causal then tobacco control research and intervention also will benefit other public health goals on improved nutritional status and consequential health benefits. These results have potential to affect the population living in the developing world.

**Conclusion**

The disease in a community can be compared with an iceberg. The floating tip of the iceberg is what the physician sees in the community, that is formed by the clinical cases. The big submerged part of iceberg represents the hidden mass of disease, which is formed by inapparent, pre-symptomatic and undiagnosed cases and carriers in the community. Water line represents the demarcation between apparent and inapparent disease.

This is approached at chair side, where the public health dentists see the harmful effects of tobacco use and they spend more time with the patient than other physicians. They should use this time to counsel the patient by promoting the oral health and healthy lifestyles. This can be achieved through few minutes of focused talk during oral examination and make the patient aware and conscious of the harmful effects of tobacco use. Thus, every interaction of public health dentist with their patients at every visit can lead to a significant change in patient’s attitude and behaviour toward tobacco cessation.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethics Committee Approval:** Not obtained, as it is a review.

**References**


Effective Usage of Exhaled Volatile Organic Compounds in Disease Diagnosis: A Comprehensive Review

G.S. Karthick¹, P.B. Pankajavalli²

¹Research Scholar; ²Assistant Professor, Bharathiar University, Coimbatore, Tamil Nadu, India

Abstract

Aim: The potentiality of exhaled biomarkers like volatile organic compounds [VOC’s] are gaining more importance and assists in accurate diagnosis of diseases. The main aim of this article is to reveal the existing methodologies on evaluating the exhaled VOC’s with respect to the diagnosis of various diseases which includes asthma, chronic obstructive pulmonary disease [COPD], lung cancer, chronic kidney disease [CKD] and acute respiratory distress syndrome [ARDS].

Literature Source: This comprehensive review was conducted based on the literature identified in PubMed, PsycINFO, Medline Plus and other various search results. This article explores the diagnosing of diseases like asthma, COPD, CKD and ARDS via monitoring the VOC’s in exhaled breath.

Findings and Discussions: From the records identified, twenty two studies were found to be eligible for comprehensive review which includes 1,223 healthy subjects and 1,206 patients. The non-invasive techniques used for collecting and analyzing the VOC’s in exhaled breath and its outcomes were mined. This review seamlessly discloses the differences between the healthy subjects and patients with severe disease.

Conclusion: It is found that exhaled breath VOC’s summary of humans are potential enough to correctly diagnose multiple diseases. The findings has recognized various standardization challenges and proof is required before adapting this practice into clinical diagnosis.

Keywords: Exhaled breath, VOC’s, COPD, CKD, ARDS, Asthma, Pulmonary diseases, Biomarkers

Introduction

Health monitoring technologies and diagnostic tools are highly indispensable for assisting physicians in identifying diseases and its stages [¹]. The accurate and earlier detection of diseases supports the timely treatment and exposes the demand for cost effective and non-invasive diagnosis of diseases. Initially, non-invasive method is used for evaluating the airway inflammation and it is convinced by sputum. Various researchers shown the biomarkers in exhaled air for disease prediction [²]. Greek physicians identified that the volatile contaminants in human exhaled breath has evidence to few diseases [³]. Pulmonary diseases has the significance of causing illness in adults and children [⁴]. Lung cancer is the major disease which causes death because it is mostly identified only at the final stage of the disease that restricts to provide response to the treatments [⁵]. Besides, lung diseases like COPD and asthma are strongly draining the life of human and incurs more cost for treatment. Furthermore, CKD is also a life critical disease which can be easily predicted by analyzing the VOC patterns in the exhaled breath [⁶]. Hence, the earlier diagnosis of these diseases are extremely important for extending treatments and controlling the disease severity. The existing medical tools are not sufficient for accomplishing the earlier diagnosis and later through continuous evolvement of techniques, the non-invasive methods has been introduced for analyzing the VOC’s in exhaled breath. In this review article, the role of VOC’s and its potentiality of clinical usage in disease diagnosis is extracted.

Exhaled volatile organic compounds & techniques for analyzing exhaled breath

Most of the pulmonary diseases like asthma, lung cancer, COPD and ARDS are influenced by airway
inflammation and oxidative stress that are highly helpful in disease diagnosis. From the study [7], the invasive techniques like bronchoscopy, radiological patterns and biopsy for analyzing airway inflammation and oxidative stress is expensive and have more complications when it is being used on children. There is a need for non-invasive technique like exhaled breath analysis for analyzing airway inflammation and oxidative stress. The nitric oxide is a helpful biomarker in few pulmonary diseases and it is not well suited for allergic patients [8]. VOC’s can be originated either externally or internally, hence some of the VOC’s are influenced by the environment pollutants. But other VOC’s are originated by the body via patho-physiological processes [9]. The internally formed VOC’s is termed as endogenous which are highly formed by lipid peroxidation [9]. Apart from hydrocarbons. VOC’s like nitrogen, oxygen and sulphur are formed by bacteria and also through patho-physiological processes on body parts [9]. Such VOC’s in expired breath of diseased patients clinically potential enough to predict the pulmonary diseases [9]. The authors in [10,11] identified that VOC’s are highly related to CKD and diabetes mellitus. Most cases of CKD is accompanied with diabetes mellitus and CKD is clinically recognized in patients with high ammonia in exhaled air [38]. The presence of high concentrated isoprene may tend to renal failure [12] and the several aldehydes are found in exhaled breath of CKD patients [13].

Various techniques are existing for collecting, identifying and analyzing the VOC’s in exhaled breath [9]. Gas Chromatography [GC] is a commonly used technique which stores the exhaled breath in bags and VOC’s are analyzed using either gas chromatography mass spectrometry [GC-MS] or gas chromatography flame ionization detection [GC-FID] [9]. E-Nose is another technique in which an array of nano-sensors has been used for analyzing the VOC’s. Furthermore, other techniques like selected ion flow tube mass spectrometry [SIFT-MS], proton transfer reaction mass spectrometry [PTR-MS] and gold nano particles sensors [GNP] [14].

**Method of Literature Search**

The study was conducted by searching the literatures in PubMed, PsyCINFO and Medline Plus using the index terms which includes volatile organic compounds, VOC, VOC’s, exhaled air, human exhaled breath, non-invasive, e-nose, oncologic diseases, chronic obstructive pulmonary disease, COPD, acute respiratory distress syndrome, ARDS, asthma, lung cancer, Gas Chromatography, GC, SIFT-MS, GNP, chronic kidney disease and CKD. In Table 1, the attributes required for examining the validity of study is shown.

**Table 1 Characteristics of Evidence included for VOC Studies**

<table>
<thead>
<tr>
<th>Diseases</th>
<th>Assessment &amp; Subject Size</th>
<th>Technique</th>
<th>No. of Markers</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Children with allergic asthma – 32, Control Subjects- 27</td>
<td>GC-MS</td>
<td>9</td>
<td>[15]</td>
</tr>
<tr>
<td></td>
<td>Children with asthma – 63, Control Subjects- 57</td>
<td>GC-MS</td>
<td>8-22</td>
<td>[16]</td>
</tr>
<tr>
<td></td>
<td>Patients with asthma- 35, Control Subjects- 23</td>
<td>GC-MS</td>
<td>15</td>
<td>[17]</td>
</tr>
<tr>
<td></td>
<td>Patients with asthma- 27, Control Subjects- 24</td>
<td>GC-MS, eNose</td>
<td>NM</td>
<td>[18]</td>
</tr>
<tr>
<td></td>
<td>Patients with asthma- 26, Control Subjects- 14</td>
<td>GC-FID</td>
<td>NM</td>
<td>[19]</td>
</tr>
<tr>
<td>COPD</td>
<td>COPD Patients with AAT deficiency- 10, COPD Patients without AAT deficiency- 23, Control Subjects- 10</td>
<td>eNose</td>
<td>NM</td>
<td>[20]</td>
</tr>
<tr>
<td></td>
<td>Patients with COPD- 30, Patients with COPD + BC- 54, Control Subjects- 35</td>
<td>IMS</td>
<td>120</td>
<td>[21]</td>
</tr>
<tr>
<td></td>
<td>Patients with COPD- 22, Control Subjects- 14</td>
<td>GC-FID</td>
<td>NM</td>
<td>[22]</td>
</tr>
<tr>
<td></td>
<td>Patients with COPD- 119, Control Subjects- 63</td>
<td>GC-MS</td>
<td>NM</td>
<td>[23]</td>
</tr>
</tbody>
</table>
Twenty-two studies were identified and included for the analyzes, in which five articles defined the VOC’s in asthma, one in ARDS, four in COPD, eleven in lung cancer and one in CKD. In total, 1206 healthy subjects and 1279 patients were examined which includes 183 asthma patients, 19 ARDS patients, 258 COPD patients, 735 lung cancer patients and 84 CKD patients.

Many studies revealed that analysis of VOC’s provides an accurate results in predicting the asthma disease as shown in the Table 1. In [14, 15, 17], authors found that VOC profile can easily differentiate the asthma patients from healthy subjects. The selected asthmatic study includes 183 asthmatic patients and 145 healthy subjects were differentiated through VOC analysis. In which 157 asthma patients were discriminated from 131 healthy subjects using VOC profiles whereas 26 asthma patients were discriminated from 14 healthy subjects using single VOC compound.

The diagnosing of COPD patients at a final stage may lead to death, so early prediction of COPD can benefit the patients with high level of interventions. Many studies in [11, 21, 23], accurately distinguish the COPD subjects from healthy subjects. COPD can be predicted by analyzing the narrowed VOC profiles [36] and the increased levels of ethane has been recognized in COPD patients [22]. This study includes 258 COPD patients and 122 healthy subjects were differentiated through VOC’s analysis. In which 236 COPD patients were classified from 108 healthy subjects using VOC profiles where 22 COPD patients were discriminated from 14 healthy subjects using single VOC (ethane) compound.

The subjects with LC can be discriminated from the healthy subjects using various grouping of VOC’s by GC-MS technique [27, 28, 29]. From these studies, it is found that common VOC’s for diagnosing the LC may include pentane, butane, propane, propanol, aldehydes and benzene. In the LC identified subjects, many VOC’s
level were raised but the isoprene level is found to be depleted [37]. Among totally included 657 LC patients and 891 healthy subjects, 291 LC patients were distinguished from 577 health subjects by single VOC compound analysis whereas 366 LC patients were separated from 314 healthy subjects by using VOC’s profiles. In [35], the studies successfully found that increased level of pentane and decreased level of isoprene in ARDS reported subjects. The high concentration of ammonia and nitric oxide in the exhaled breath observed in CKD subjects [38].

**Conclusion**

Nowadays the existing tools and techniques are not satisfying the needs of healthcare providers, so there is an elevated interest contributed by the researchers to improve the various disease diagnoses through the non-invasive measurement of exhaled VOC’s. The present research primarily focusing on multiple VOC’s rather than single VOC compound. Likely, this study reported the ability of VOC’s profiles through which diseases like asthma, COPD, ARDS, CKD and lung cancer can be diagnosed and monitored accurately. Conversely, it is binding to resolve the issues like validation and standardization prior to the adoption of VOC’s analysis for clinical practice.

**Conflict of Interest**: Nil.

**Ethical Clearance**: This review doesn’t meet any ethical clearance.

**Source of Funding**: Self.

**References**

1. Bhairavi P. Exhaled breath analysis a review of clinical applications to determine oxidative stress. [Access on 10 November 2018].


Patients Health Monitoring System Using IOT

Sudha Senthilkumar¹, Brindha.K², Charanya R³, Abishek Kumar⁴

¹Associate Professor, ²Assistant Professor(SG), ³Assistant Professor, ⁴B.Tech (IT) Student,
School of Information Technology and Engineering, Vellore Institute of Technology, Vellore, Tamil Nadu, India

Abstract

The past health survey shows death of few thousand people due to their heavy workload and mental pressure. Death of more patients is unavailability of doctors in critical situation. With the advancement in technology, the proposed system can monitor the patient’s body condition uninterruptedly from anywhere in the world. The researcher is planned to make an inter-net of things for health care system which can monitor health of human being. In emergency situation notification will be send to doctors immediately. It takes the body parameters like Temperature, humidity, and pulse sensor and body movements. Analysis of patients’ body data is done against the normal situation to track abnormal physiological parameters.

Keywords: Temperature, humidity, pulse sensor, body movements.

Introduction

Every year we hear about a new disease whose cure is not invented till now like in 2014 Ebola outbreak happened; in 2016 Avian influenza A (H7N9) virus outbreak. The past report shows few of them eradicated and still some of the disease exists today [1-2]. Its outbreak results in uncountable numbers of patients. It is very hard to maintain regulation of health of each patient. This paper presents a solution to patient monitoring system⁶. The researcher has used sensors to record body as well as surrounding conditions of patients. Each patient is monitored individually with a given set of sensors⁷. Sensors data is sent on cloud website like thingspeak periodically. The sensors read temperature, humidity, heartbeat and body movements. Data is sent on thingspeak website and analysis of data is done to trace abnormal condition of patients. Doctors are called to see the patients without loss of time. Notification is send using prowl and thinghttp integration. Notification is sent to doctors in emergency⁵.

Proposed Scheme

The proposed system consists of Arduino mega as micro-controller unit. The various modules and components are combined are shown in the diagram. Two types of power supplies 3.3V and 5 V passed to the system and few modules are operated in 3.3 V. The digital sensors such as humidity, temperature, etc are linked to Arduino’s digital pin and the sensor which generates the analog signal is linked to analog pin of the Arduino. The Wi-Fi module or the Ethernet Shield (HANRUN) is used in this system for inter-net connectivity⁴.

Figure 1. Proposed System Architecture
The digital / analog data are passed to the Arduino by internet connection and all the monitored data sent to the ThingsSpeak. The ThingsSpeak considered as cloud environment. When all the sensors are connected together, sensors sense data from human body, then send that data to server. After that these data is compare with standards values that are already stored in system. According to that normal and abnormal condition checking is performs. And if abnormalities occurred then it send message immediately to doctors to avoid critical condition. The system is controlled by administrator. It can control entry of new patient’s details and doctors details when it will get data from sensors and is displayed in separate UI page which refresh periodically and save data in database. Time interval is 10 seconds. When abnormalities occur, message is sent to doctor’s mobile within 1 minute.

**HARDWARE MODULE**

**Arduino mega**

![Figure 2: ARDUINO MEGA](image)

It consists of 54 digital pins. Each of pins on the Mega can be used either as an input or output, using various function such as pinMode(), digitalWrite(), and digitalRead() functions. They operated at 5 volts. Each pin can receive or provide a maximum of 40 mA and has an internal pull-up resistor (disconnected by default) of 20-50 kOhms. Some of pins have special features.

- **Serial:** 0 (RX) and 1 (TX); Serial 1: 19 (RX) and 18 (TX); Serial 2: 17 (RX) and 16 (TX); Serial 3: 15 (RX) and 14 (TX). Used to transmit (TX) or receive (RX) and TTL serial data.
- **External Interrupts:** 2 (interrupt 0), 3 (interrupt 1), 18 (interrupt 5), 19 (interrupt 4), 20 (interrupt 3), and 21 (interrupt 2). The above pins can be configured to trigger an interrupt on a low, high or falling edge.
- **PWM:** 2 to 13 and 44 to 46. These pins Provide 8-bit PWM output with the analogWrite() function.
- **SPI:** 50 (MISO), 51 (MOSI), 52 (SCK), 53 (SS). These pins support SPI communication.
- **LED:** 13. There is a built-in LED connected to digital pin 13. When the value of pin is HIGH, the LED is on, when the value of pin is LOW, it is off.
- **I²C:** 20 (SDA) and 21 (SCL). Support I²C (TWI) communication using the wire library (documentation on the Wiring website). Note that these pins

**SENSORS**

**DHT11**

The dht11 (humidity and temp. sensor) read the temperature and humidity of surrounding around patients and send the data back to serial monitor in module testing. It has one data cable to read the surrounding. After reading data from surrounding, it also sends the data to thingspeak using esp wifi module.

**WIFI**

The Nodemcu wifi module take SSID, password to connect to wifi and thingspeak api to connect to the thingspeak server using port 80. It sends the data to thingspeak after every 20 seconds. It uses espwifi header file is required to send and connect.

**ACCELEROMETER**

Accelerometer used adxl335 to read the movement of patients and to record it and send respective data to thingspeak website. It uses three connections each one for x, y, z direction.

**GPS (neo -6s)**

It makes a connection to GPS satellite to read the data and send the data to thingspeak website through wifi module. It consists of one antenna and receivers. It read the longitude and latitude of our system on earth.

**PULSE SENSOR**

It read the heart beat and sends the data to arduino to serial plotter and serial monitor. It has three connections one of them is used to read the heart beat and other two is used to make connection.
Patient Monitoring System Architecture

The patient’s monitoring system is implemented using the following algorithm:

- The data is collected using sensors and send using Arduino. The patients wear the sensor on their body and data is collected. Some sensors are present in the room like DHT sensors to collect room temperature and humidity.

- The sensors data is send through wifi (esp8266 module) which is connected to Internet via router.

- The data is sent to thingspeak server and saved in to remote database.

- The administrator uses the data and analyzes it against normal situation. In case of emergency the doctor gets the message about patient’s situation and his/her ward information’s.

Results

Due to vast changes in the IT domain, the proposed system should be capable of adopting any changes. In this system sensors can be included without affecting other parts of the system and play a vital role in maintenance. The system designed to adopt any further modifications. The result shows the system provide good performance and accuracy. Figure 4, 5, 6 and 7 show the result of temperature, humidity, latitude and longitude.
Indian Journal of Public Health Research & Development, April 2019, Vol. 10, No. 4

255

Figure 8.a X-axis

Figure 8.b Y-axis

Figure 8.c Z-axis

Figure 8.a, 8.b and 8.c Show the result of accelerometer x-axis, y-axis and z-axis direction.

Figure 9 Shows the result of ECG data.

Figure 9 ECG data

Conclusion

The proposed health care system based on internet of things. It stores the person sensitive information in to cloud and they can check their sensitive information at any time. In emergency situation notification will be send to doctors immediately. It takes the body parameters like Temperature, humidity, and pulse sensor and body movements. Analysis of patients’ body data is done against the normal situation to track abnormal physiological parameters. The system result shows that it monitors the patient condition and any change in the normal condition, message alert pass to registered user.

Conflict of Interest – NIL

Source of Funding- Self

Ethical Clearance – NIL

References


Nanosensors in Blood Glucose Measurement: A Review

G.Kavitha¹, K.Senthil Kumar²
¹Research Scholar, ²Professor, Dept. of Electronics & Communication Engineering, Dr.M.G.R. Educational and Research Institute

Abstract

Diabetes is a fast growing problem nowadays worldwide. Diabetes, not a curable disease needs blood glucose to be measured very often. Blood glucose measurement is by various methods. Glucose sensors help in measuring blood glucose level. Glucose sensors employ various methods in different technologies to measure blood glucose level. Recently nanosensors employs nanotechnology for blood glucose measurement. Nanosensors fabricated by different nanomaterials has high sensitivity because of high surface to volume ratio. This paper discusses the several methods to measure blood glucose with the advantage and disadvantage.

Keywords — nanosensors, blood glucose, methods, advantage, limitation, nanotechnology

Introduction

Diabetes is a leading cause for the death of millions of people in the world. Diabetes damage blood vessels of heart, brain and legs affecting various parts of our body like eyes, feet and kidney. Diabetes increases cardiovascular problems like heart attack, stroke and atherosclerosis.[1]. Diabetes cannot be cured but controlled by blood glucose measurement. Blood glucose measurement takes place with various methods which suggest a suitable technique by its advantage and disadvantage. Glucometer, Continuous glucose monitoring sensors, Glucose sensors with nanotechnology and nanosensors are the methods to evaluate the glucose concentration.

Methods for glucose measurement:

Glucose measurement is commonly by Glucometer. The Glucometer is a low-cost effective method but a painful sampling process which has large fluctuations between sampling time points and not possible to take if a patient is occupied. Continuous glucose monitoring is another method for glucose measurement with the advantage of increased frequency of measurement and limitation of the implanted sensor inside the body for several days.[2] Glucose sensors employ nanotechnology for this process which offers fast response, improved catalytic activity and high surface area.[3]

Nanotechnology glucose sensors have few drawbacks like sensor fouling and decreased sensor lifetime. Nanotechnology has many applications in the field of medicine. Nanotechnology develops nanosensors that help to calculate glucose level. Nanosensors have a variety of rewards namely small size, high surface area/ volume ratios allowing larger signals, better catalysis and more rapid movement of an analyte through sensors, accuracy, lifetime and usability of sensors.

Medium and Biomarker for Glucose measurement:

Glucose measurement can be in blood, urine, saliva, tears and sweat which is an invasive or non-invasive process. Glucose concentration is high in blood when compared to other parameters. Blood Glucose calculation is an invasive method which offers low cost and reliable procedure with the limitation of highly uncomfortable for patients, Infection risk from injured skin.[4]

Urinal glucose concentration is a non-invasive method with an advantage of painless, affordability and disadvantage of low accuracy and low glucose concentration levels. Sweat glucose level is a non-invasive method that provides painless, easy sample collection and cost-effective method. This method has a drawback of low concentration, require high sensitivity and selectivity for better results.[5]
Saliva glucose level is a non-invasive method with simple collection procedure and minimally non-invasive technique. It has the limitation of high calibration time, inaccurate readings, low glucose concentration levels. Tear glucose concentration is a non-invasive method which is highly accessible, cost-effective and has numerous testing methods. This method has a disadvantage of poor correlation with blood glucose level, requires a low detection limit and lack of a suitable power source for testing.

Blood glucose level helps in diagnosis of diabetes which can also be diagnosed by breath as a medium using acetone as a biomarker. This method offers an advantage of easy to use, quick results and painless process with a limitation of many factors in result analysis.

**Literature Survey:**

Algorithm used, advantages and disadvantages of several papers were analysed

1. Wearable contact lens biosensors for Continuous glucose monitoring using Smart phones, “Mohamed Elsherif” [2018] [7]

   A photonic microstructure was printed on glucose-selective hydrogel. Bragg diffraction modulation correlate periodicity constant and glucose concentration. Sensitivity of the sensor was 12µa/mm. The saturation response time was less than 30 min. Glucose concentration is within 0–50 mm. Signal drift due to electrochemical reaction in-stability. Resulting in time lags and sensor replacement every 3–7 days.


   A skin like nanostructured biosensor system (SNBS) is developed to measure glucose level in non-invasive method. Increase the signal-to-noise ratio. Sensitivity is high. Linear sensing range is large. Accuracy is improved. Challenge lies in the fabrication of the multilayer biosensor. Small detection limit.


   Point of care diagnosis method used for continuous glucose monitoring. High sensitivity. Better patient compliance contrary to invasive ones. Biofouling, fibrous encapsulation of the implanted electrode, inflammation, and loss of host vasculature, affect the precision and accuracy of the blood glucose results, lifetime of the sensors-7 days, cost, toxicity, inconvenience and discomfort


   Diabetic nephropathy diagnosed using electrodynamics Monte carlo simulation. High efficiency up to 72%, Signal and the noise are visible. Sensing should occur in few minutes otherwise signal & noise become indistinguishable.

5. Highly efficient non-enzymatic glucose sensor based on CuO modified vertically-grown ZnO, “Rafiq Ahmad” [2017] [11]

   Non-enzymatic glucose sensor using Electrochemical Impedance Spectroscopy. Large surface area. Easy substrate penetrable structure. High sensitivity with excellent reproducibility, repeatability, stability, selectivity, and applicability for glucose detection in human serum samples. Linear range up to 8.45 mm. The low limit of detection (0.40 µm) Short response time (<2 s)


   Sensors based on a membrane containing immobilized glucose Oxidase and catalyse coupled to oxygen electrodes and a telemetry system, integrated as an implant for 180 days. Feasible. Sensor/telemetry system configured without enzymes as a long-term oxygen sensor to asses permeability. Anaesthesia in abdominal tissue sites in a 25-min outpatient procedure by making a superficial incision 4.5 cm long and dividing the subcutaneous adipose tissue to create a pocket 0.5 to 1.0 cm below the skin surface. Sensitivity varied randomly at an average rate of −2.6%/week for all sensors. Sensitivity to glucose is quasi-linear.


   Breath analysis Chemi-resistant type breath sensors are employed. Non-invasive, simple, and low-cost diagnostic method. High Sensitivity and selectivity.
Biomarkers can be generally found in the blood at relatively high concentrations. Requires more analysis time due to the pre-concentration step to increase the detection capability. Multiple volatile organic compounds should be accurately detected and statistically analysed using sensor arrays with high sensitivity and selectivity.

8. Highly sensitive and wearable In2O3 Nanoribbon transistor biosensors with Integrated on-chip gate for glucose Monitoring in body fluids, “Qingzhou Liu” [2017] [14]

Nanowire-based field-effect Transistor (FET) biosensors are used for glucose monitoring. A better electrical performance with gate voltage. A high on–off ratio and good mechanical robustness. Very large detection range spanning at least five orders of magnitude and a detection limit down to 10 nm. Glucose levels in body fluids is lower than in blood. Results can be affected by ambient Temperature changes, mechanical deformation caused by body Motion, and the sample collection procedure.


Microwave non-invasive blood glucose Monitoring system operating at around 1.4 GHz with a sensor head, a portable vector network analyzer, data logger and a PC split-ring resonator. Exceptional accuracy and repeatability. Restrictive in use. Involves the use of portable network analyser. Not Fully wearable/portable.


Saliva nanobiosensor using amperometric measurements and Clarke error grid analysis to measure glucose level. Excellent clinical accuracy. A Time lag between the peak glucose values from blood and saliva. Noninvasive, Reliable, convenient, fast, and continuous salivary glucose Monitoring for personal and point-of-care use. Only healthy individuals included so that there were no extreme high/low glucose values detected. Sensitivity and reliability limited by spectral signal-to-noise level and skin thickness. Difficulty to collect sweat. Low level of accuracy.

11. Ultrathin gold as a sensor platform for biomolecules, “Christoph Nick” [2015] [17]

Enzyme free approach for glucose Detection applying ultrathin gold films using Keithley software. Miniaturization, safety and most important long-term stability of the enzyme and transducer. Valid for single crystalline films with no grain boundary scattering.

12. Non-Enzymatic Graphene-Based Biosensors for Continuous Glucose Monitoring, “Mahmoud A Sakr” [2015] [18]

Cyclic Voltammetry (CV) and the amperometric method for measurement of glucose. Sensor fabrication, X-ray Photo-electron Spectroscopy. Overcomes enzymatic nature; namely, irreversibility, drift, and interference with body fluids, which affect their accuracy, reliability and longevity. Large surface area increases speed, output current. Highest sensitivity increase the porous structure of graphene. Provides fast response and high reversibility. Minor sacrifice in sensitivity and selectivity.


Nanodiamond depositing onto Silicon substrate via a spray method. Nanodiamond consist unique qualities such as biocompatibility, easy functionalized, non-toxic material, strength and chemical inertness. The potential of the spray method can be improved by studying the effect of spray force, the height of spray in future to get an optimum condition for deposition of a nanodiamond.


In-vivo implantable biomedical device- glucose monitoring uses cyclic voltammetries to verify performance control. Long-term stability, selectivity, calibration, miniaturisation and repetition, power in a downscaled and portable device. Silicon structure along with titanium enhance biocompatibility, implanted device provide reliability. Multiple organisations and sources of data. Detect specific type of target.

15. I-V characteristic effects of a fluidic-based memristor For glucose concentration detection, “Nor Shahanim, Mohamad Hadis, and Asrulnizam Abd Manaf” [2014] [21]

Thin film TiO2 fluidic-based memristor sensor using keithley 4200-scs semiconductor characterization
system. The I-V curve produces a small difference for low concentration. Minitab regression analysis indicates memristor resistance has a quadratic relationship with glucose concentration which is not strong.

Comparison of various parameters from the literature survey is graphically plotted.

Sensitivity is the ability of a test to identify the disease which is high in nanomaterials. Sensitivity depends on surface to volume ratio. Surface to volume ratio is contingent upon diameter. Electrical measurement also determine the sensitivity of nanosensor which include resistivity and conductivity. Width of the nanowire calculate the resistivity which improve ohmic characteristics of the device. Ohmic characteristics improves the sensitivity of the nanosensor. The sensitivity of different nanomaterials in glucose measurement compared in Fig:1. Silicon nanomaterial with gold deposition increase current density and sensitivity of 130.4µa/mm

Fig:1 Comparison of the sensitivity of various nanomaterials

Sensitivity and linearity from amperometric I-t curve compared with different nanomaterial. From Fig:2, Linearity gets improved when silicon deposited with gold nanomaterial

Fig:2 Comparison of linearity of various nanomaterials

Limit of detection(LOD) defined as the lowest quantity or concentration of a component detected with a given analytical method. LOD is small in most of the nanomaterials as shown in Fig:3.

Fig:3 Comparison of the detection limit of various nanomaterials

Response time is time taken for a person or system to react to a given stimulus or event. The response time of different methods of glucose measurement compared in Fig:4. Response time is very fast in nanosensors when compared with other methods.

Fig:4 Comparison of the response time of various methods of glucose measurement.

A correlation coefficient is a statistical measure that calculates the strength of the relationship between the relative movement of two variables. The correlation coefficient of various methods of glucose measurement compared in Fig:5
Nanomaterials:
Nanosensors fabricate with various nanomaterials for different applications. Various nanomaterials used in sensor fabrication namely nanotubes, nanowires, nanofibers, nanocomposites, nanorods, nanostructured polymers and different allotropes of carbon as carbon nanotubes, graphene or fullerene. Nanoparticles are 0-D structures with spatial dimensions between 1 to 100 nm. Nanoparticle has good bioassay because of small size. This bioassay property binds the target molecule and enhance the signal. Nanotubes and Nanowires are 1-D nanostructures with characteristics diameter between 1 to 100 nm. Nanowire has current flow close to the surface. This current flow make nanowire to exhibit good sensitivity. Carbon nanotubes has unique feature of electrical and mechanical properties. This feature attain nanotube to show high surface to volume ratio. Nanofibre has good sensitivity only for low concentration level. Nanocomposites are bi-dimensional nanostructure materials of anionic exchange. This nanocomposites have ruggedness and durability. Nanocomposites have better selectivity. Nanostructured surfaces have thickness between 1 to 100 nm. Dimensions above 100 nm are termed 3-D nanostructures.[22]

Sensor fabrication uses various nanopowders. Iron nanopowder increase the enzyme content in blood. The increase in enzyme result in weight gain. Copper nanopowder raise mineral exchange like potassium, sodium, calcium and phosphorus which affect the bone tissues. Carbon Nanotubes are inert and functioned with a probe molecule. Au and Ag nanopowders are mostly used in medicine. ZnO nanoparticles has high surface to volume ratio, wideband gap, good piezoelectric characteristics, chemical stability and biocompatibility. Cost of production of ZnO nanoparticles in mass production is high when compared to Si nanoparticles. Nanodiamond less than 10 nm in diameter used for biomedical applications[23].

Conclusion
Diabetes a fast growing problem needs a level of glucose to be measured very often. Different methods of glucose in various techniques reviewed in this paper. From the literature survey glucose measurement by an invasive technique is a painful process which leads to the non-invasive method. Various nanomaterials compared which suggest Silicon-dioxide deposited with gold has high sensitivity and good linearity. Silicon substrate increase biocompatibility, stabilise operating temperature, increase the sensitivity.

Ethical Clearance - Not Required
Source of funding - Self
Conflict of interest - Nil

References
7. Elsherif M, Hassan MU, Yetisen AK, Butt H.


Aggression in Psychiatric Unit: What is the Feeling of Psychiatric Nurses?

Binil V1, Christopher Sudhaker2, Supriya Hegde3, Unnikrishnan B4, Alphonsa Ancheril5

1Assistant Professor-Senior Scale, Department of Psychiatric Nursing, 2Professor of Manipal College of Nursing and Director of Quality, Manipal Academy of Higher Education, Manipal, 3Professor, Department of Psychiatry, Father Muller Medical College, Mangaluru, 4Associate Dean, Kasturba Medical College, Mangaluru, 5Vice Principal, Professor & Head-Department of Psychiatric Nursing, Athena College of Nursing, Mangaluru

Abstract

Background: The client directed aggressive and violent behaviour towards nurses working in psychiatric setting is a universal issue. The nurses spend most of the time with clients, which make them more vulnerable to any form of injuries during the process of managing aggressive clients without having the required knowledge and skill. Around 20-45% of hospitalized clients with psychiatric disorders show violent behaviour. Objective: To identify the feelings of psychiatric nurses on client directed violence with a view to develop an aggression management and violence prevention training programme for nurses working in psychiatric setting. Method: Qualitative approach was used for the study. A focus group discussion was conducted among 30 psychiatric nurses identified by the nurse administrators of the selected hospitals. Convenient sampling technique was adopted for selecting the participants. Thematic analysis was used in this study to identify and analyze important themes. Results: The following themes were derived from the thematic analysis: Fronting vs management of aggressive clients, facilitating vs facilities available for aggression management, traditional vs training, prevention vs management, suggestion vs support from the hospital management, and expectation vs engagement in an aggression management training programme. Conclusion: An aggression management and violence prevention training programme was designed based on the educational interventions derived from the focus group discussion.

Key words: aggression, psychiatric unit, psychiatric nurse, feeling

Introduction

Client related aggression is an enduring problem in psychiatric setting. It is a multidimensional problem with serious concerns. These aggressions are verbal or physical and most of the time towards healthcare providers. Around 20-45% of hospitalized clients with psychiatric disorders show violent behaviour. It has been reported that the prevalence of violence experienced by the mental healthcare providers due to aggressive client behaviour is between 14% and 61%.1

The client directed aggressive and violent behaviour towards nurses working in psychiatric setting is a universal issue. The nurses spend most of the time with clients, which make them more vulnerable to any form of injuries during the process of managing aggressive clients without having the required knowledge and skill.2 Hence, aggression management and violence prevention remains a challenging task for the nurses. Many of the clients whose aggression is due to serious mental illness are secluded or restrained every day.3 Aggressive and violent behaviour is very common among psychiatric inpatients and need to be identified early and managed professionally. Otherwise it can promptly worsen to potentially dangerous behaviour towards clients or healthcare providers.
A survey was conducted in Mysore, India to assess the clients and visitors aggressive behaviour towards 249 staffs working in the psychiatric and medical units. The results showed that 16% of the staffs working in the psychiatric area were exposed to different forms of violent behaviour for more than a month. The study concluded that training in violence management may be a defensive factor to reduce the prevalence of violence.4

An online survey was conducted in the Netherlands to assess the prevalence, nature and consequences of violence against 1534 mental healthcare professionals working in clinical psychiatry. The study findings showed that 67% of the participants experienced physical violence at least once in the last 5 years. The consequences were very severe in some cases which also affected the employer. The study concluded that violence in clinical psychiatry is a severe and substantial problem.5

The aim of conducting a focus group discussion was to develop a need based training programme for nurses to deal with client directed aggression and violence. Survey and other quantitative methods has limitations to go in-depth into the phenomenon the investigator want to elicit. Therefore to design a need based training appropriate to the context and the work culture, a focus group discussion was conducted among psychiatric nurses identified by the nurse administrators.

Method

A qualitative research approach was used for the study. A focus group discussion was conducted among psychiatric nurses working in different hospitals of Udupi and Dakshina Kannada Districts. Six open ended questions were developed and validated by the researcher for the focus group discussion. The researcher attempted to find answers for the following questions from positive deviant nurses working in psychiatric setting.

How do nurses manage the situation when their client get violent in the ward?

What are the facilities or equipment available in their ward to manage the client with aggression and violence?

What is their choice of training?

What are their roles to prevent the client from going in to aggression?

What kind of support do they need from the hospital management to prevent or manage patient aggression?

What are their expectations regarding aggression management training programme?

Selection of the participants: Convenient sampling technique was adopted for selecting 30 psychiatric nurses for the focus group discussion. An informed consent was taken from all the participants prior to the data collection. The participants were informed that confidentiality of the discussion is taken care by the researcher. The focus group discussion took place among psychiatric nurses working in a psychiatric setting. The nurses who are having a minimum of 5 year experience were selected for the qualitative discussion.

Setting of the Focus group discussion: The focus group discussion was conducted in 6 hospitals of Dakshina Kannada and Udupi districts of Karnataka.

Data collection procedure: The participants were called to a room arranged by the hospital authority which was away from other disturbances. The sitting arrangements were done for the comfort of the participants. The investigator developed a rapport with all the participants before conducting the discussion. Each discussion lasted for 40-45 minutes. The language of the discussion was English and it was audiotaped. Confidentiality was maintained throughout the study by giving participant numbers to each group.

A voice recorder was kept on the table to audio record the discussion. The discussion was also noted down by the researcher on the day of the discussion. Each of the focus groups took place at the participant’s place of work. Both the recorded and written material helped in the analysis of the focus group discussion.

Statistics: Thematic analysis was done to analyze the qualitative data.6 The following steps were used to generate the themes; familiarizing ourselves with our data, generating initial codes, searching for themes, reviewing themes, defining and naming themes and producing the report. Verbatim with the emerged theme was given for validation to five experts from the field of qualitative research. The corrections were taken in to consideration. Whenever in doubt or ambiguity, the investigator went back to some of the participants and revalidated the meaning of the verbatim.
Results

The discussion mainly focused on identifying the strengths and opinion of the expert nurses. The following themes were derived from the thematic analysis.

Fronting vs. Management of Aggressive Clients: The majority of the focus groups expressed that aggressive clients cannot be managed alone. They verbalized that physical or chemical restraints are useful for deescalating the clients. Furthermore, they also said that risk assessment is important before managing the clients. However, this is not possible because of various reasons. Therefore, at present it faces the situation as and when it comes, in terms of its management.

Facilitating vs. Facilities available for Aggression Management: The majority of the nurses expressed that, currently, they facilitate aggressive clients and also face dangers to self and to other clients. They feel that they lack many facilities. Though they have physical restraints, these are very nascent. The physical restraints used in most of the settings are not strong to manage a violent client. They also require muscle power like male nurses and securities to control and sedate the violent clients.

Traditional vs. Training: The focus group discussion revealed that at present, aggression management is done traditionally by nurses who are not specialized in psychiatric nursing, without adequate skill in aggression management. Nurses expressed that training on aggression management must include risk assessment, de-escalation, use of proper defense mechanisms, and use of proper restraints (physical/chemical); which will be more beneficial for taking care of the aggressive clients.

Prevention vs. Management: The majority of the nurses revealed that risk assessment and de-escalation skills will help them to prevent violence. Most of the nurses expressed their interest in learning about maintaining a safe and secure environment in their ward.

Suggestion vs. Support from the hospital management: The staff expressed that, though there are policies and procedures about aggression management and violence prevention, implementing variables like staff requirement, skill mix, training and soft limb restraints are not adequate.

Expectation vs. Engagement in an aggression management and violence prevention training programme: Most of the focus groups revealed that, the majority of the staffs are aware about the importance of undergoing a special training to prevent violence in their setting. But, they are not getting the opportunities to develop their competency by attending a special training.

Educational interventions derived from the themes: Risk assessment- tools and techniques, positive positioning while standing in front of a violent client, self-control plan for the nurse to control his or her own anger while dealing with an aggressive client, environmental strategies to prevent and control violence in the hospital setting, code violet response to deal with psychiatric emergency situation, safe breakaways for self-protection, safe use of restraints and communication, and de-escalation techniques. The derived themes are depicted in figure 01.

Discussion

The present study identified the facets of aggression management and violence prevention training for nurses using focus group discussion with psychiatric nurses. Six themes were derived from the thematic analysis and many educational interventions were identified from those themes. Martina et al 2016 expressed that the most useful method for managing aggression are medication therapy and the use of restraints.7 In the present study also nurses expressed these therapies as traditional treatment methods.
Jacobs et al 2012 assessed psychiatric nurse practitioners’ experience of working with acute psychiatric patients. The study revealed that nurses expressed that working with psychiatric patients are unsafe and a burden for them. Most of the nurse practitioners experienced negative emotional reactions and attitudes towards patients and it compromised the quality of patient care. In the present study also positive deviant nurses expressed that they are not very safe around a violent client.

Ingrid et al 2010 conducted a qualitative study among 45 general practitioners working in psychiatric emergency setting. The participants expressed that psychiatric patients’ unpredictable behavior is a threat to their personal safety as there are limited resources to manage unpredictable behavior. General practitioners also shared that present level of security system cannot manage patients with mental illness. Positive deviant nurses from the present study also expressed similar concern.

Tella et al 2016 conducted a focus group discussion among nurses working in psychiatric setting aimed at exploring the violent events and to examine the suggestion to prevent violent incidences. Most of the nurses expressed that their experience helped them to predict violent behaviors from patients. Majority of the nurses suggested to improve the therapeutic communication techniques which may help to prevent violence. The similar suggestions were also came out from the present study.

**Conclusion**

The focus group discussion mainly focused on identifying the strengths of the expert nurses and various practical information came out from the discussion. Six major themes were identified and many educational interventions were derived from the themes. Overall the qualitative discussion helped to design an aggression management and violence prevention training programme for nurses working in psychiatric and emergency setting.

**Acknowledgment:** The authors would like to acknowledge the administrators of all the six hospitals who have given permission to conduct the study.

**Ethical Clearance:** Taken from Institutional Ethics Committee of Kasturba Medical College, Mangaluru

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**


Caries Prevention by Biofilm Control: Newer Frontiers in Management

Sowmya Sridhar¹, Baranya Shrikrishna Suprabha², Arathi Rao³
¹Post Graduate Student, ²Professor and Head, ³Professor, Department of Paedodontics and Preventive Dentistry, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Manipal, India

Abstract

Since the advent of the Ecological plaque hypothesis of caries etiology, concepts in the prevention and control of caries have changed drastically. These contemporary approaches aim at modifying the existing biofilm and neutralize the environmental factors that may predispose to the creation of disease. This review discusses the need for such approaches in the long-term prevention of caries and also provides a bird’s-eye view to the clinician on the various strategies available for the same.

Key words: Dental caries, dental plaque, biofilm, prevention

Corresponding Author:
Dr. Suprabha B. S.
Department of Paedodontics and Preventive Dentistry, Manipal College of Dental Sciences, Light House Hill Road, Mangalore – 575 001, Karnataka, India.
Telephone: 091-0824-242271, 091-0824-242871
(off) Fax: 091-0824-242653
E-mail:suprabha.bhat@manipal.edu

Introduction

Dental caries is one of the most prevalent chronic diseases affecting people worldwide, although the prevalence and severity varies in different populations¹. The etiology of dental caries is generally agreed to be a complex one complicated by many factors. Overall, it is based on three essential factors: acidogenic/aciduric microorganisms, dietary carbohydrates, and host factors. Since there is no single agent identified, there is no simplistic method of disease prevention².

However, caries is still an “infectious disease”, and develops as a result of an ecological imbalance in the stable oral microbiome, causing the enrichment of some oral pathogens³. The advent of this ecological hypothesis in caries etiology has shifted the focus away from “traditional pathogens” as being solely responsible for disease.

Caries as a biofilm-mediated disease

In plaque, the bacteria function as an organized, and metabolically integrated community, the properties of which are greater than the sum of the component species⁴. Such an ordered way of formation renders stability to the dental plaque, within which microbial homeostasis is seen⁵.

Marsh stated that a considerable environmental change in a biofilm can affect microbial homeostasis and alter the balance among the resident organisms⁶. Disease can therefore be prevented by interfering with environmental processes that break down homeostasis and cause plaque biofilm dysbiosis⁷.

Newer caries-preventive approaches acknowledge that it is necessary to not only correct the environmental factors, but also help maintain a healthy, microbially diverse, resident microbiome⁸. This review aims to provide a brief overview on the newer strategies available in the modification of oral biofilms.

Review method

An electronic search of publications was made using the electronic databases ScienceDirect® and PubMed® through our institutional membership access. The inclusion criterion was abstract or full text articles including Original research, reviews, or systematic reviews. The keywords used for the search were selected listing the following five combinations:
Prevention of biofilm formation through blocking initial attachment: Anti-adhesive strategies

Adhesion of microbial surfaces to host tissue is a critical event in infection and pathogenesis. Cell recognition of microbial surfaces is mediated by carbohydrate-receptor recognition. After a ligand’s recognition of a receptor, initial adhesion is followed by complex colonization leading to the development of elaborate biofilm structure known as the EPS (Extracellular Polymeric Substance) architecture.

Anti-adhesive strategies aim at blocking this attachment at an early stage thereby altering the structural integrity of the biofilm.

Anti-adhesin antibodies

Adhesion of *S. mutans*, is facilitated by a cell surface adhesin named streptococcal antigen I/II which binds the microorganism to the glycoprotein component of the pellicle. In an early animal study, local passive immunization with monoclonal antibodies (Mc Ab) directed against the surface adhesins of *S. mutans* resulted in decreased *S. mutans* colonization in the fissures and smooth surfaces.

Significant retardation of *S. mutans* recolonization was also seen following the application of a synthetic peptide to tooth surfaces pretreated with chlorhexidine gluconate, in a human trial. However, the diversity of adhesins is such that biofilm formation may continue by other routes, even if one route is blocked.

Antimicrobial peptides

Antimicrobial peptides (AMPs) are a heterogeneous group of molecules with a wide range of antimicrobial characteristics, adept at controlling bacterial infections and modifying biofilms because they lyse microbial cells only by interaction with their biomembranes. Therefore, the creation of resistance forms is also very low. Apart from naturally secreted salivary AMPs, laboratory synthesized peptides have also been discussed in caries research.

Selectively Targeted Antimicrobial Peptides

The STAMP (Selectively Targeted Antimicrobial Peptides) approach involves selective delivery of antimicrobial compounds in high concentrations to selected bacteria. An antimicrobial peptide C16G2 targeting *Streptococcus mutans* has been found to be effective in the complete killing of *S. mutans* with minor effect on the other noncariogenic strains of streptococci.

Similarly, an antimicrobial decapeptide named KSL-W, has been found to selectively destabilize the cell membranes of cariogenic bacteria like *S. mutans*, *S. sobrinus*, and *L. acidophilus*. The use of KSL-W as an additive in a chewing gum preparation, and as a bioconjugate with a hydroxyapatite-binding heptapeptide has also been suggested. However these are very expensive and are susceptible to the action of salivary proteases.

Modifying the bacterial interactions

Quorum sensing targets

Quorum sensing (QS) is a bacterial intercellular communication mechanism for controlling gene expression in response to population density for a particular stimulus. Because of these cell-cell interactions, bacteria in a biofilm are able to function as a group against competitors or while adapting to varying physical stresses, cellular differentiation, and species evolution.

Deregulation of a QS system causes structurally disturbed biofilms. A scanning electron microscopy study found the architecture of biofilms formed by defective *S. mutans* strains to be abnormal with reduced biomass. Recently, a compound, 3-Oxo-N, was seen to significantly minimize lactic acid accumulation, even in the presence of fermentable sugars by modifying the quorum sensing pathway. Bacterial growth is not directly influenced by this signaling pathway. Therefore, less virulent strains will still remain in the biofilm and the chances of antibiotic resistant mutants are very low.

Bacteriocins and mutacins

Bacteriocins are peptides that are bactericidal for other bacteria belonging to similar species. Mutacins are bacteriocins produced by *S. mutans*.

A histidine kinase gene, *ciaH*, was discovered in 2004, whose inactivation abolished mutacin production. Surprisingly, the same mutation also diminished competence development, stress tolerance, and acid tolerance.
and sucrose-dependent biofilm formation.

Photodynamic therapy

Antimicrobial photodynamic therapy (aPDT) is based on the concept that a photoactive dye, also known as a photosensitizer, can be preferentially taken up by bacteria and subsequently activated by light of a specific wavelength, to generate singlet oxygen and free radicals that are cytotoxic to the microorganisms.

Many dyes such as toluidine blue O, methylene blue, photofrin, Rose Bengal dye and erythrosine have been tested as photosensitizers with positive results. White light (λ=600-650nm), LED light (λ=610 nm), diode laser (λ=665 nm) with different durations of application (1-5 minutes) have been used. A recent systematic review evaluated the effects of PDT on S. mutans and C. albicans biofilms, using methylene blue as the photosensitizer and concluded that significant results were present, especially with a longer pre-irradiation time of 15 minutes. A remineralization approach in the arrest of root surface caries has also been successfully tried, involving photodynamic treatment and use of casein phosphopeptide-amorphous calcium phosphate.

Designer bacteria

The concept of designer bacteria, for example, S. mutans strains that lack the acid production capacity, has been researched. In 2010, a true “designer bacterium” was synthesized- Mycoplasma mycoides JCVI. These cells only had the designed synthetic DNA sequences. Even though the genetic material had been modified, these cells were still seen to retain the capacity for continuous self-replication. However, the entire concept is yet to gain widespread acceptance for emotional, ethical, or legal reasons.

Probiotics

Probiotics are “live micro-organisms that, when administered in adequate amounts, confer a health benefit on the host”. Probiotic bacteria are believed to have both local anti-caries and systemic effects. The most commonly studied and used probiotics belong to the Lactobacillus and Bifidobacterium bacterial genera. Laboratory studies involving the use of live yoghurts showed antibacterial activity against S. mutans, A. actinomycetemcomitans, P. gingivalis and P. intermedia from multispecies biofilms.

Koll et al isolated oral lactobacilli based on their probiotic properties and concluded that L. plantarum, L. paracasei, L. salivarius and L. rhamnosus, in particular exhibited high antimicrobial activity. However, a recent systematic review concluded that current evidence is not sufficient for recommending probiotics in the control of dental caries, even though promising results are seen.

Natural products

Include polyphenolic compounds isolated from plants, fruits or herbs. The presence of more than one phenol unit per molecule confers the antimicrobial activity to these compounds.

A recent systematic review revealed enhanced antiadhesive and antibiofilm activity by the extracts obtained from plants like Vitis vinifera, Pinus spp., Coffea canephora, Galla chinensis (Black grapes, cranberry, coffee, tea) on multispecies oral biofilms, with Vitis vinifera being the most promising natural antimicrobial.

The antimicrobial efficacy of propolis, a resinous extract from honeycombs, against three common oral pathogens (S. mutans, P. gingivalis, F. nucleatum) and a yeast (C. albicans) has also been documented. Natural products still remain a largely unexplored territory in the field of caries research, considering the efficacy and non-toxic nature of these molecules.

Conclusions

Innovative strategies that can influence the nature of the biofilm are the need of the hour. Further research in the form of randomized controlled trials are required to ascertain the clinical efficacy of these newer strategies and develop a working protocol for their use in routine caries management.

Ethical Statement: There were no ethical issues/concerns in the making of this review

Conflict of Interest: The authors declare no conflict of interest

Source of Funding: Self

References


Comparative Efficacy of Three Different Retreatment Rotary Instrument Systems for Removal of Gutta-Percha from Root Canals: A Comparative in Vitro Study

Jasmine Mary Antony¹, Aravind R. Kudva², Harish K Shetty³, Shravan Kini⁴, Sree Gowri⁴

¹Post graduate Student, ²Reader, ³Senior Prof & Head of the Department, ⁴Reader,
Department of Conservative Dentistry and Endodontics, Yenepoya Dental College, Deralakatte

Abstract

Introduction: Failures of endodontic treatment requiring re-treatment contain a tremendous dimension of patients. Complete removal of gutta-percha from root canal walls, reestablishing working length, disinfection and re-obturing the root canal are the main goals of non-surgical retreatment to obtain predictable success.

Aim: The aim of this study is to compare the efficacy of three rotary instrumentation systems that is protaper retreatment system, Mtwo Retreatment Files and Neoendo Retreatment Files for removal of gutta-percha from root canal.

Materials and Method: Thirty freshly extracted, single-rooted human teeth were instrumented with Protaper Gold rotary file system, and each root canal was filled with gutta-percha and AH Plus (Dentsply Detrey, Konstanz, Germany) sealer using lateral compaction. Specimens were divided randomly into three groups of 10 specimens each. The removal of gutta-percha was performed using protaper retreatment files, Mtwo retreatment files, and Neoendo files after 1 week. The amount of root canal filling material remnant was measured using stereomicroscope and computer image analysis program.

Results: In Mtwo on an average gutta percha remaining on root canal wall was 11.9 ± 1.5, in Protaper system it was 6.66 ± 1.56 and in Neoendo system it was 2.08 ± 1.42.

Conclusion: Neoendo is better with least remaining gutta percha compared to Protaper compared to Mtwo Retreatment files.

Keywords: Protaper retreatment files, Root canal retreatment, Mtwo retreatment files, Neoendo retreatment files.

Introduction

Failures of endodontic treatment requiring re-treatment contain a tremendous dimension of patients. Complete removal of gutta-percha from root canal walls, reestablishing working length, disinfection and re-obturing the root canal are the main goals of non-surgical retreatment to obtain predictable success.

The main goal of retreatment is cleaning and shaping of the root canal with removal of old root filling material, and this can be achieved by either hand instruments or rotary instruments. Endodontic retreatment can be done either by nonsurgical retreatment (orthograde) or by apical surgery (retrograde).¹

Several techniques have been proposed to remove filling materials from the root canal system, including the use of endodontic hand files, Nickel-Titanium (niti) rotary instruments, Gates Glidden burs, heat, ultrasonic instruments, laser and use of adjunctive solvents. Conventionally, the removal of gutta-percha using hand files with or without solvent can be a tedious, time-consuming process especially when the root filling material is well compacted.²

Corresponding Author:
Dr Aravind R. Kudva
Reader and Guide, Department of Conservative Dentistry and Endodontics, Yenepoya Dental College, Deralakatte-575018

DOI Number: 10.5958/0976-5506.2019.00703.4
Various rotary nickel–titanium (Ni–Ti) files and rotary instrumentation systems such as Profile (DENTSPLY Tulsa Dental, OK, USA), Quantec (Sybron Dental Specialties, CA, USA), K3 (Sybron Dental Specialties, CA, USA), and race (FKG Dentaire, Germany) have been introduced for removal of root filling materials and have proved to be more efficient and safer than the traditional hand files.¹

Protaper Ni–Ti rotary system has been upgraded to the Protaper retreatment system which includes shaping, finishing, and retreatment instruments. The three retreatment instruments are designed for removing filling materials from root canals and have various tapers and diameters at tip. D1, D2, and D3 have diameter sizes 30, 25, and 20 with 0.09 taper, 0.08 taper, and 0.07 taper, respectively. Full length of these retreatment files is 16 mm for D1, 18 mm for D2, and 22 mm for D3. These instruments have convex, triangular cross-section and D1 has an active working tip that facilitates its penetration into filling materials.¹

Mtwo Retreatment Files consist of two instruments with active cutting tip: R1 (size 25, 0.05 taper) and R2 size 15, 0.05 taper. They have an S-shaped cross-section as do the files of the basic sequence, but a shorter pitch length to enhance the advancement of the file into the filling material. These instruments are characterized by two cutting edges, which are claimed to cut dentine effectively.³

Neoendo Retreatment Files Consists of three instruments N1 (size 30, 0.09 )taper For Coronal One-third which is 16mm in length and has a blue ring.N2(size 25, 0.08 taper)For Middle One-third which is 18mm in length and has a red ring and N3(size 20, 0.07) For Apical One-third which is 25mm in length and has a yellow ring.

Because the removal of filling material represents a crucial step in retreatment success.⁴ The aim of this study is to compare the efficacy of three rotary instrumentation systems that is Protaper retreatment system ,Mtwo Retreatment Files and Neoendo Retreatment Files for removal of gutta-percha from root canal.

**Materials and Method**

Thirty freshly extracted human single-rooted teeth, each with a single root canal, were selected for this study from the Department of Oral And Maxillofacial Surgery, Yenepoya Dental College.

Access cavities were prepared using high-speed diamond burs with copious water spray. A size 10 K-file was placed in the canal until it was visualized at the apical foramen. The working length was determined by subtracting 1 mm from this measurement.⁵

The root canal was prepared using Protaper Gold rotary file system (DENTSPLY Maillefer) according to the manufacturer’s instructions. The files were operated using an electric motor (X-Smart; Dentsply Maillefer) with a 16:1 reduction hand piece.⁶

RC-Prep (Premier Dental Products, Philadelphia, USA) was used as a lubricant during instrumentation. A glide path was performed using proglider (Dentsply Maillefer; size 16, 0.02 taper) file to the working length. In all the tooth samples, the root canals were instrumented to the working length using the following sequence: SX, S1, S2, F1, and F2. The first three shaping files were used with a brushing action, and the last two finishing files were used with a nonbrushing action until the working length was reached.

During instrumentation, the canals were irrigated with 2 ml 5.25% sodium hypochlorite.⁶ Each instrument was used to prepare three canals and then discarded. Upon completion of instrumentation the canal was flushed with saline as the final irrigant and dried using absorbent paper points.⁷ Obturation was done using AH plus sealer and F2 gutta percha points ( Dentsply Maillefer) using lateral condensation obturation technique. The access of canals was sealed with glass ionomer cement and the specimens were stored at 37°C in 100% humidity for 7 days.⁸

**Retreatment technique**

The teeth were decoronated at the cemento-enamel junction with a diamond disk to leave a root of 15mm in length and specimens were were divided randomly into three groups of 10 specimens each. Two millimeters of obturation material was removed using Gates Glidden drills 1, 2, and 3 from cervical part of all the specimens.¹

Then, 0.05 ml of xylene solvent was introduced into each canal to soften the gutta-percha.

Two or three additional drops of xylene solvent were applied as required to reach the working length. During retreatment, the root canals were constantly irrigated
with 2.5% sodium hypochlorite. Rotary instruments were used in a brushing circumferential motion whilst pressing against the root canal walls to remove gutta-percha. The obturation removal was done using one of the following techniques:

**Group 1: Protaper Group**

Protaper retreatment files were used in crown-down manner in a brushing motion at constant speed of 500 rpm as per manufacturer’s recommendation. D1 (size 30; 9% taper) was used in the coronal third, D2 (size 25; 8% taper) in the middle third, and D3 (size 20; 7% taper) in the apical third as specified by the manufacturer.

**Group 2: Mtwo Group**

Mtwo retreatment files were used in gentle in-and-out technique along with short brushing motion with an air-driven rotary handpiece at constant speed of 300 rpm as per manufacturer’s recommendation. R1 (size 15; 5% taper) was first used to working length and then followed by R2 (size 25; 5% taper) used up to the working length.

**Group 3 Neoendo Group**

Neoendo retreatment files were used in the following sequence using light apical pressure at a constant speed 350 rpm as per manufacturer’s recommendation. Neoendo retreatment file N1- (size 30, 0.09 taper) for coronal one-third, N2- (size 25, 0.08 taper) for middle one-third, and N3- (size 20, 0.07 taper) for apical one-third were used with a crown-down technique.

On withdrawal, the files were cleansed of any obturating material before being reintroduced in the root canal. Each file was discarded after being used in three teeth.

Retreatment was considered complete when no remnants of gutta percha and sealer were observed on instrument surface or in the irrigating solution.

Roots were grooved longitudinally using a diamond disk, preparing grooves parallel to the long axis of buccal and lingual surfaces, and split gently using a chisel into halves. Sections that showed evidence that the groove had penetrated into the root canal space or exhibited an irregular cleavage were discarded, replaced by a new specimen. For practical purposes no attempt was made to differentiate between gutta percha and sealer remnants.

Specimens were observed under stereomicroscope at 8x magnification. Microphotographs were recorded with a digital camera and subsequently analyzed using Digital Image Analyzing Software (Motic Images Plus 2.0ML) and the amount of gutta-percha/sealer on the canal walls was measured in mm. Collected data was analysed by both descriptive and inferential statistical methods.

Descriptive methods such as mean and standard deviation were obtained to summarize the data of parameters in each group. Inferential methods such as ANOVA was performed to find the significant difference across the group and Bonferroni post hoc analysis was performed to find the significant different in pair vise.

**Results**

In Mtwo group on an average gutta percha remaining on root canal wall was $11.9 \pm 1.5$, in Protaper group it was $6.66 \pm 1.56$ and in Neoendo group it was $2.08 \pm 1.42$.

ANOVA test shows that there is significant difference between the systems as $p = 0.000$ 0.001 further post hoc analysis revealed that remaining gutta percha was significantly different between all the groups so we conclude that Neoendo is better with least remaining gutta percha compared to Protaper compared to M2 Retreatment files.
Table 1: Comparison of the mean of total GP remaining on the entire root canal wall

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
<th>ANOVA test p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mttwo</td>
<td>10</td>
<td>11.19</td>
<td>1.51</td>
<td>10.12</td>
<td>12.27</td>
</tr>
<tr>
<td>Protaper</td>
<td>10</td>
<td>6.66</td>
<td>1.56</td>
<td>5.54</td>
<td>7.77</td>
</tr>
<tr>
<td>Neoendo</td>
<td>10</td>
<td>2.08</td>
<td>1.42</td>
<td>1.06</td>
<td>3.09</td>
</tr>
</tbody>
</table>

Table 2: Multiple comparison between the three groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Difference</th>
<th>Std. Error</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mttwo</td>
<td>4.539</td>
<td>.669</td>
<td>.000</td>
</tr>
<tr>
<td>Protaper</td>
<td>9.118</td>
<td>.669</td>
<td>.000</td>
</tr>
<tr>
<td>Neoendo</td>
<td>4.579</td>
<td>.669</td>
<td>.000</td>
</tr>
</tbody>
</table>

Neoendo<Protaper<Mtwo

Discussion

Removal of filling material is an important factor in root canal retreatment because it allows chemomechanical reinstrumentation and redisinfection of the root canal system. To date, it has not been proven that complete removal of filling materials will ensure success of root canal retreatment and that remaining material will cause the retreatment to fail. However, removing as much filling material as possible from inadequately prepared and/or filled root canal systems would appear to be essential in order to uncover the remaining necrotic tissues or bacteria that may be responsible for periapical inflammation and persistent disease.¹¹

One of the most difficult to control parameters in this study was the extent of the anatomical variations that are generally present in human teeth. Variations in original root canal morphology greatly influence the changes that occur after root canal preparation and as a logical extension, after retreatment procedures. In order to minimize these variables a standardized length of root canal filling was adhered to and only teeth with straight canals were selected.¹²

In this study, direct visual scoring with the aid of a stereomicroscope, as proposed earlier, was adopted for the evaluation of residual gutta-percha and sealer on the canal walls, as it was considered a simple and efficient assessment method.¹³

Traditionally, chloroform was used as a popular solvent for gutta-percha removal due to its ability to rapidly dissolve gutta-percha. However due to its carcinogenic nature as reported by the International Agency of Research of Cancer, the use of alternative solvents such as xylene, orange oil, halothane, and tetrachloroethylene has been suggested for the removal
of gutta-percha. Among these, xylene has been found to have the best dissolving efficacy.¹

Das et al (2017) conducted a study to compare the relative efficacy of three rotary instrumentation systems (Protaper retreatment files, Mtwo retreatment files, and R-Endo files) for removal of gutta-percha from root canal during endodontic retreatment. Protaper group was found to have less remnant filling material as compared to the other groups in coronal and middle thirds with/without the use of solvent, but a significant difference was observed between Protaper and Mtwo and Mtwo and R-Endo in the nonsolvent groups (P < 0.05). Mtwo group demonstrated less amount of remaining filling material in the nonsolvent group.¹

Studies done by Tasdemir et al. And Bramante et al. demonstrated that, Protaper Universal retreatment files and Mtwo NiTi rotary instrumentation system are faster and more efficient in removal of obturation material than hand files.¹ Rotary NiTi instruments have also been proposed for removal of filling materials from root canal walls and various studies reported their efficacy in cleaning ability and safety.¹⁴

Neoendo retreatment files has a niti metallurgy design featuring parallelogram cross section, positive cutting edge with microgrinding manufacturing technology. There is no literature review regarding Neoendo retreatment file hence study was conducted with available data obtained from manufacturer.

Analysis of the overall means of residual filling material showed significantly less values for Neoendo retreatment files followed by Protaper universal retreatment instruments and Mtwo retreatment instruments.

In earlier retreatment studies, remaining gutta-percha was assessed radiographically or residual gutta-percha were measured using evaluation scales, e.g. Severe, moderate, mild or no-retreatment debris. In the present study, the roots were split longitudinally and the residual filling material was measured linearly. Delineation of the remaining filling material with aid of softwares is more precise than the utilization of scores. This precision is related to image magnification on the computer, providing better quality of images.¹⁵

**Conclusion**

Under the experimental conditions all three rotary systems proved to be helpful and safe devices for gutta-percha removal in orthograde endodontic retreatment. Niti systems such as Neoendo or Protaper performed better than Mtwo retreatment system in terms canal cleanliness. The use of xylene as a solvent helped to reduce working time and to enhance root canal cleanliness. Nevertheless, completely cleaned root canal walls could not be achieved with any of the techniques under investigation.¹⁶

**Conflict of Interest** – None

**Source of Funding** - Self

**Ethical Clearance** – Taken

**References**


Digital India, Digitizing the Orthodontic Office- Our Experience with Design and Implementation of a Contemporary Patient Management System

Nidhin Philip Jose¹, Siddarth Shetty², Dilip G Naik³, Shravan Shetty⁴, Asavari Desai⁵, Ashith MV⁶, Lida Mary⁷

¹Reader, ²Professor and Head of Department, Department of Orthodontics and Dentofacial Orthopaedics, ³Professor and Dean, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Manipal, ⁴Assistant Professor, Department of Orthodontics and Dentofacial Orthopaedics, ⁵Reader, ⁶Reader, Department of Orthodontics and Dentofacial Orthopaedics, Manipal College of Dental Sciences, Mangalore, ⁷Assistant Professor, Department of Oral and Maxillofacial Surgery, AJ Institute of Dental Sciences, Mangalore

Abstract

In today’s fast-paced world, it is essential to stay abreast of the ever-changing trends in technology. This will help us to leverage technology for the benefit of our patients. The availability of fast internet connectivity, cloud based solutions and smart devices are making it possible to bring it greater speed, efficiency and safety into existing processes and systems.

This clinical paper attempts to highlight the positive transformation of a traditional Orthodontic Department upon adopting the latest technologies in patient management.

The Orthodontic Patient Management System is a comprehensive patient management software that resulted from a collaborative inter-institutional effort to create a fast, responsive and secure patient management system that incorporated our way of functioning. In essence, we tailor made our patient management software. The OPMS takes into consideration all the needs and requirements of a large orthodontic department and digitizes the entire patient flow, from the first appointment until debonding; stores patient records securely and facilitates appointment placement.

Keywords: Electronic patient management, Orthodontic Office.

Introduction

In today’s fast-paced world, it is essential to stay abreast of the ever-changing trends in technology. It is imperative that we leverage technology for the benefit of our patients. The availability of fast internet connectivity, cloud based solutions and smart devices are making it possible to bring it greater speed, efficiency and safety into existing processes and systems. Digital technologies have the potential to improve diagnosis; facilitate patient treatment procedures; and streamline storage, transfer and retrieval.

The prevalence of electronic patient records is higher in developed economies. Over time, such systems are gaining popularity in India as well. Both clinicians and patients stand to benefit from adoption of digital techniques. It is imperative that clinicians view the adoption of digital technology as a synergistic add on to their practice. A study conducted in Canada revealed that 73% of the orthodontists felt that digital technology was helpful in consultation with patients and other specialists.
Digital dentistry may be broadly defined as any dental technology or device that incorporates digital or computer controlled components in contrast to that of mechanical or electrical alone. The adoption of digital patient management system adds to the digital triad that already exists in our clinical settings; namely digital photography, digital radiography and digital models. This will further increase the efficiency of our model of health care delivery.

This clinical paper attempts to highlight the positive transformation of a traditional Orthodontic Department upon adopting the latest technologies in patient management.

The Orthodontic Patient Management System (OPMS) is a comprehensive patient management software that resulted from a collaborative institutional effort to create a fast, responsive and secure patient management system that incorporated our way of functioning. In essence, we tailor made our patient management software. The OPMS takes into consideration all the needs and requirements of a large orthodontic department and digitizes the entire patient flow, from the first appointment until debonding; stores patient records securely and facilitates appointment placement.

The Orthodontic Patient Management System (OPMS)

The OPMS is a unique software. Its uniqueness lies in the fact it was designed by orthodontists who studied the workflow patterns, optimized processes and then created a digital platform to best serve the needs in an orthodontic clinic.

This software implements an access based login system wherein each user has a unique user name and password. The features and the information accessible to the user depends on the type of the user id. At its core, the OPMS has two fixed user profiles, named as the Head of Department (HoD) and the Clerk (Admin) and multiple number of temporary profiles named as instructors/clinicians and post-graduates. The fixed user profiles are unchangeable but the temporary profiles can be created and disabled as required. (Figure 1)

It employs a simple user interface, which is not cluttered and easily accessible. The left hand side of the screen reveals the navigation tabs and the center of the screen displays the data.

Figure 1 – Access controlled login

Figure 2 – User Interface
Each user profile has a bouquet of features and information available that is curated according to their need. It also maintains data privacy by restricting patient information access. The clinicians and postgraduate doctors can view/edit patient profiles personally treated by them and not by others. (Figure 2)

The software provides for electronic recording of patient information in a phased and systematic manner. The data recorded is stored and digitally transmitted to instructors for approval. Computer aided learning (CAL) is a useful addition to the tool kit of an educator. It has been shown in research that Computer aided learning (CAL) is effective to teach students\(^6\). The OPMS aids in teaching and supervision of clinical cases. The user, hence making the system tamper proof, cannot edit data once approved. This makes it extremely valuable for a medico legal standpoint. Orthodontic treatment has a long course and a single treatment happens over multiple visits.

The software enables capture of data at each visit with a provision to approve or reject the data. OPMS also allows users to upload patient images, lateral cephalogram and OPG images and CBCT. The file formats of .JPEG, .PDF and .PPT are supported. Data in the system are stored on three servers, one at site and two off site. This ensures that data integrity is maintained and patient data is not lost in the event of a hardware malfunction.

OPMS also facilitates patient scheduling. The software sends an SMS to the patient once the appointment is set as a reminder. It also informs the patient if the appointment is rescheduled for some reason. This simplifies patient scheduling and improves patient recall and satisfaction. (Figure 3)

![Figure 3: Patient Scheduling](image)

Research is a very important part of all teaching hospitals today and the OPMS can help clinicians in research through its innovative “Reports” section. This is an analytics function, which enables the user to search and retrieve data from case files from a research standpoint.

![Figure 4: Reports and Analytics](image)
Functions of the Orthodontic Patient Management System

1. It facilitates paperless recording of patient information
2. It ensures confidentiality of patient information
3. It enables patient scheduling for efficient working
4. The software augments specialty training by helping the users to learn and track the treatment done in a phased manner.
5. Teaching learning is facilitated through a feedback mechanism
6. Ability to retrieve patient records for research purposes

The salient features of the OPMS software are as follows-

1. OPMS uses two fixed user ids – the admin clerk and the Head of Department.
2. User ids for staff and postgraduates are generated in requisite multiples and deactivated when access is no longer desired.
3. Search feature enables user to locate a patient based on name, father’s name or file number
4. Completely digital patient record file to record information
5. Multiple choice based answers helping the users to quickly complete entering patient details
6. Treatment plan once decided locks and does not allow modification by users
7. Visit details for each appointment are also submitted online with photographs and appropriate records
8. Online assessment of the submitted data by supervising staff and Head of Department
9. Analytics feature enables the software to read and generate smart reports. Users can list out cases based on malocclusion, treatment done etc.
10. Access to information based on the hierarchy of the user
11. Guest ids can be created for allowing read only access to patient archives
12. Ability to schedule appointments for patients
13. Patients receive SMS reminders whereas doctors and supervising staff get notification regarding the upcoming appointments
14. Patient data is securely stored in multiple locations

Advantages

1. Paperless system- environmentally friendly
2. Reduction in manpower (by avoiding need to store and paper retrieve files)
3. Safety of the records- addresses medicolegal considerations
4. Improved our branding and image

Disadvantages

5. Setting up digital infrastructure and high speed internet entails high upfront cost
6. There may be issues with incompatibility among various software

Conclusion

The key challenges in the pathway to doing digital include infrastructure and cost. The setting up of a high-speed network to transfer and store data is a prerequisite. However, over the long term the costs average out and are significantly lower than manual based systems. Institutions should lead the way forward and set up teams with expertise in information technology to develop electronic patient records specific for their individual needs or explore options of purchasing commercially available systems.

Lastly, Going digital is now no longer a choice but a necessity.

Conflict of Interest- Nil

Funding- This project was funded by internal funds of Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Manipal
Ethical Clearance- Clearance obtained from Institutional Ethical Clearance Committee.

References


3. Palmer; Perceptions and attitudes of Canadian orthodontists regarding digital and electronic technology; American Journal of Orthodontics and Dentofacial Orthopaedics 2005

4. Prithviraj; Revolutionizing restorative dentistry: An overview; J Indian Prosthodont Soc 2014

5. P.J Sandler; Digital Records in Orthodontics; Dental Update 2017

6. Lowe; Computer-aided Learning (CAL): an effective way to teach the Index of Orthodontic Treatment Need (IOTN)?; J Orthod 2001

7. Magni; Solving incompatibilities between electronic records for orthodontic patients; American Journal of Orthodontics and Dentofacial Orthopaedics 2007

8. JC Atkinson; Electronic patient records for dental school clinics: more than paperless systems; Journal of Dental Education, American Dental Education Association 2002
Multi-State Models for the Time to Event Post-Transplantation Cancer Data: A Competing Risks Approach

Chinnaiyan Ponnuraj¹, Valarmathi Srinivasan², Pari Dayal L³, B.Krishna Prasanth⁴, K.M.K.Masthan⁵

¹Scientist D, Department of Statistics, National Institute for Research in Tuberculosis (ICMR), Chennai, India, ²Department of Epidemiology, The TamilNadu Dr.MGR Medical University, Chennai, India, ³Assistant Professor, Department of statistics, Madras Christian College, Chennai, India, ⁴Assistant Professor, Dept. of Epidemiology & Research Faculty, COCPAR, Sree Balaji Dental College & Hospital, Bharath Institute of Higher Education & Research, ⁵Professor & Head, Dept of Oral Pathology, Sree Balaji Dental College & Hospital, Bharath Institute of Higher Education & Research

Abstract

In clinical research studies complex end points are most common. Especially in studies on diseased patients undergo therapy, a relapse can occur, or patients can die after relapse or without former relapse (death). Sometimes, endpoints can be reasonably combined in a composite endpoint, as relapse and death combined into disease-free survival (DFS). In this case, standard survival techniques, as Kaplan–Meier estimation of the DFS probability, can be applied. Often, interest focuses on endpoints for which competing risks are present; a competing risks model plays a special case of a multistate model. A more complex multistate model is required when the effects of events occurring in the course of the study on further disease progress. Another endpoint of interest is time to experience multiple episodes; the multistate model used for analysis must be adapted for this event structure. The aim of this report is to explain use and interpretation of both non proportional hazard Cox (non PH) and proportional hazard Cox (PH) type multistate models for the suitability of assessing different covariate effects in situations of multiple endpoints and also different baseline hazard assumptions in a comparison manner for the European Group for Blood and Marrow Transplantation (EBMT) competing risks data.

Keywords: survival analysis, competing risks, multi-state models, R,mstate

Introduction

In survival analysis, we often concentrate on the time to a single event of interest. In practice, there are many clinical examples of where a patient may experience a variety of intermediate events. Standard survival analysis considers the time until some first event only, whereas competing risks models analyse the time until some first event and the event type that occurs at that time. Competing risks also model the endpoint type but it does not model subsequent events such as multiple events. To do this, more complex multistate models are needed and want to investigate covariate effects for each specific transition between states.

Multi-state models are very much constructive tool to answer questions in survival analysis which cannot be answered by classical models. In recent times, multi-state and competing risks models have been considered with high regard in survival analysis. The multistate framework models events as transitions between states and includes competing risks as a special case. The occurrence of a competing risk is modelled as a transition out of an initial state (e.g. no progression) into a competing risk state (e.g. progression). The transition takes place at the time of the first event. The aim of the present article is to explain use and interpretation of Cox-type regression models for competing risks and multistate models for more complex event structures. To overcome this problem, the analysis of multi-state
Models with transition-specific covariates:

The mstate package supports the analysis of typespecific Cox models. Events are of the same ‘type’ or ‘stratum’ if they share a baseline hazard. We consider a model in which ‘type’ is equivalent to transition: each transition has its own baseline hazard. Here, we believe a usual ‘proportional baseline hazards model’. In both models, covariates can have the same effect for all transitions or different effects for different transitions; in the latter case, transition-specific covariates are needed. The model is a transition-specific Cox model (1)

\[ \alpha_{gh}(t) = \alpha_{gh}, 0(t) \exp(\beta^T Z_{gh}) \rightarrow (1) \]

where \( gh \) indicates a transition from state \( g \) to state \( h \), \( \alpha_{gh}, 0(t) \) is the baseline hazard for this transition, \( Z \) is the vector of covariates at baseline and \( Z_{gh} \) is the vector of transition-specific covariates. This model specifies different covariate effects for different transitions, as well as separate baseline transition hazards for each transition. The covariances of the estimated cumulative hazards are being computed in two different ways by means of the Aalen estimator and the Greenwood estimator. For the estimators of the regression coefficients and baseline hazards (1). Assume we have data with independent censoring and the estimation of the cumulative hazard through the Nelson-Aalen estimator \( \hat{A}(t) \) of the cumulative hazard for transition \( g \rightarrow h \) is now given by

\[ \hat{A}(t) = \sum dN_{gh}(t) / Y_g(t) \rightarrow (2) \]

where \( t \) indicates the event times, \( dN_{gh}(ti) \) is the observed number of transitions from state \( g \) to state \( h \) at time \( ti \), and \( Y_g(ti) \) is the number of subjects at risk for a transition from state \( g \) at \( ti \) (Therneau and Lumley 2010).

The transition probability matrix for the elements is as by \( P(s, t) \). It has elements

\[ P_{gh}(s, t) = P(X(t) = h \mid X(s) = g) \rightarrow (3); \]

denoting the transition probability from state \( g \) to state \( h \) in time interval \( (s, t] \). The transition probability matrix is estimated as

\[ \hat{P}(s, t) = \Pi_{u \in (s, t]} (I + \Delta \hat{A}(u)) \rightarrow (4); \]

where \( u \) indicates the event times and the elements of \( A \) are estimated as in(2) and above equation (4) is called the Aalen-Johansen estimator. The covariance of the empirical transition matrix may be estimated by ((Andersen et al. 1993) (2)

\[ \text{cov}(\hat{P}(s, t)) = \int_s^t P(u, t)^T \otimes \hat{P}(u, u -) \text{cov}(d\hat{A}(u)) \hat{P}(u, t) \otimes P(s, u -)^T \rightarrow (5) \]

models, it is applied to non- and semi-parametric (Cox) models. The sources of data have been provided by the EBMT (the European Group for Blood and Marrow Transplantation) with special interest to the modelling of different covariate effects for all transitions or transition-specific and different baseline hazard assumptions.

where \( T \) denotes vector transpose and \( \otimes \) the Kronecker product. This formulation for the covariance matrix of the Greenwood type and enables integrated cumulative hazards to not necessarily be continuous. The advantage of the Greenwood estimator yields exact multinomial standard errors for the transition probabilities when there is no censoring than the Aalen estimator. Consequently the two estimators give more or less equal results in all kind of practical applications. (2) (1). According to Fiocco et al. (3)(4) the reduced rank model which is formulated for transitions. In this model all covariates have the same effect given by the parameter
vector on each transition apart from the proportionality coefficients. We use a model in which each transition has its own baseline hazard and estimates the parameters of a reduced rank model.

**Data**

A more general introduction into competing risks and multi-state models can be found in\(^6\). There are a variety of challenges in estimating transition probabilities in multi-state models, within both non-parametric or semi-parametric and parametric frameworks\(^{6,1,5}\). We consider estimation and prediction for both semi-parametric and non-parametric models including several relevant clinical covariates. We consider the EBMT data; available in R under mstate as ebmt4\(^5\). It is purely survival after a transplant treatment of patients suffering from a blood cancer. The data have been provided by Three intermediate events are included in the model: Recovery (Rec), an Adverse Event (AE) and a combination of the two (AE and Rec). It is to be expected that recovery improves the prognosis and an adverse event deteriorates it. The model is suitable to show the size of these effects, and to capture the influence of their timing and of the covariates on the prognosis. It shows what happens when both the positive and negative event take place, as compared to one or none of them. We consider 2279 patients who were treated between 1985 and 1998. Four prognostic factors are known at baseline for all patients (see Table 1). They are: donor-recipient match (where gender mismatch is defined as female donor, male recipient), prophylaxis (Treatment), year of transplant and age at transplant in years. All these covariates are treated as time-fixed categorical covariates. The distribution of the values of the covariates over the patients in the data set is shown in Table 1.

A multi-state approach is particularly appropriate for these data, since it can help to model both the disease-related and the treatment-related morbidity and mortality. These are modeled here by including the intermediate events recovery and adverse event. Information about the occurrence of these events is used to update the prognosis of the patients. Total cases recovered 1218(53.4%), adverse event 1134(49.8%), both recovered and adverse event 660(29%), relapse 370(16.2%) and death cases 838(36.8%). We consider the following six-state model for leukemia patients after bone marrow transplantation is illustrated in Figure 1.

1. The six-state model has the following factors with six-state
   1. Transplantation
   2. Recovery
   3. Adverse event
   4. Recovery and Adverse event
   5. Relapse
   6. Death

<table>
<thead>
<tr>
<th>Table1: Prognostic factors for all patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of transplant</td>
</tr>
<tr>
<td>1985-1989</td>
</tr>
<tr>
<td>1990-1994</td>
</tr>
<tr>
<td>1995-1998</td>
</tr>
<tr>
<td>Age at transplant (years)</td>
</tr>
<tr>
<td>&lt;=20</td>
</tr>
<tr>
<td>20-40</td>
</tr>
<tr>
<td>&gt;40</td>
</tr>
<tr>
<td>Prophylaxis</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Donor recipient</td>
</tr>
<tr>
<td>Gender mismatch</td>
</tr>
<tr>
<td>No Gender mismatch</td>
</tr>
</tbody>
</table>

The detailed states have been illustrated as in Figure 1 as follows

State1. Alive and in remission, no recovery or adverse event;

State2. Alive in remission, recovered from the treatment;

State3. Alive in remission, occurrence of the adverse event;

State4. Alive, both recovered and adverse event occurred;

State5. Alive, in relapse (treatment failure);

State6. Dead (treatment failure).
According to the table 2, Starting from state 1, the patient is at risk for transitions 1,...,4. This means that the patient can move to states 2, 3, 5 and 6. At time 22, the patient moves to state 2 (Recovery), from where the patient is at risk for a further transition to state 4, 5 and 6 (i.e., transitions 5, 6 and 7). None of these occur and the patient is censored at time 995. The patient has no rows for transitions 8-12 because the patient has never been at risk for these. The value of time is equal to “Tstop”-“Tstart”; it is of use in ‘clock reset’-models, where the time t refers to the time spent in the current state. The numbers of transitions, both in terms of frequencies and percentages, are given subsequently. This process by showing a selection of the long format data for the first patient, leaving out the values at baseline and the transition-specific counterparts of “match”, “proph” and “agecl”. Because of zero having factors like year1.1 to year1.12 are being omitted.
Results and Discussion

The original covariates are retained to consider models with any mixture of basic and transition-specific covariates. It is considering for both non-parametric and semi-parametric model. The basic quantities of interest are the transition intensities or hazard rates. For the estimation of the cumulative hazard, it is assumed to have data with independent censoring. This Cox model has separate baseline hazards for each of the transitions and no covariates. In principle, the transition intensities could also be estimated separately, but the combined use of long format data and a single stratified “coxph” object makes further calculations easier.

Co-variances of the estimated cumulative hazards may be computed in two different ways: by means of the Aalen estimator or by means of the Greenwood estimator. An advantage of the Greenwood estimator is the fact that it yields exact multinomial standard errors for the transition probabilities when there is no censoring. The two estimators give almost equal results in all practical applications\(^2\)\(^3\). Since there are twelve transitions in the model, its output is not shown here in the interest of space. The head and tail of the cumulative hazards of all transitions along with time (time in years) are presented in table 3A (below.)

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Variances of hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>time</td>
<td>Haz</td>
</tr>
<tr>
<td>1 0.002737851 0.000000000</td>
<td>1</td>
</tr>
<tr>
<td>2 0.008213552 0.000000000</td>
<td>1</td>
</tr>
<tr>
<td>3 0.010951403 0.000000000</td>
<td>1</td>
</tr>
<tr>
<td>4 0.013689254 0.000000000</td>
<td>1</td>
</tr>
<tr>
<td>5 0.016427105 0.000443066</td>
<td>1</td>
</tr>
<tr>
<td>6 0.019164956 0.001333142</td>
<td>1</td>
</tr>
<tr>
<td>6199 12.48460 0.3800455</td>
<td>12</td>
</tr>
<tr>
<td>6200 12.61602 0.3800455</td>
<td>12</td>
</tr>
<tr>
<td>6201 13.02396 0.3800455</td>
<td>12</td>
</tr>
<tr>
<td>6202 13.10609 0.3800455</td>
<td>12</td>
</tr>
<tr>
<td>6203 13.12799 0.4255001</td>
<td>12</td>
</tr>
<tr>
<td>6204 17.24572 0.4255001</td>
<td>12</td>
</tr>
</tbody>
</table>

The last time point in the list indicates the last time point in the data, either of an event or of a censoring. The graph (Figure:2A) using Greenwood method illustrates all estimated cumulative hazards in different colours.
Figure 2A Greenwood Method illustration: Estimated Cumulative hazards

Table: 3B Aalen method of estimation

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Variances of hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>time</td>
<td>Haz trans</td>
</tr>
<tr>
<td>1</td>
<td>0.002737851 0.000000000 1</td>
</tr>
<tr>
<td>2</td>
<td>0.008213552 0.000000000 1</td>
</tr>
<tr>
<td>3</td>
<td>0.010951403 0.000000000 1</td>
</tr>
<tr>
<td>4</td>
<td>0.013689254 0.000000000 1</td>
</tr>
<tr>
<td>5</td>
<td>0.016427105 0.000043066 1</td>
</tr>
<tr>
<td>6</td>
<td>0.019164956 0.001333142 1</td>
</tr>
<tr>
<td>6199</td>
<td>12.48460 0.3800455 12</td>
</tr>
<tr>
<td>6200</td>
<td>12.61602 0.3800455 12</td>
</tr>
<tr>
<td>6201</td>
<td>13.02396 0.3800455 12</td>
</tr>
<tr>
<td>6202</td>
<td>13.10609 0.3800455 12</td>
</tr>
<tr>
<td>6203</td>
<td>13.12799 0.4255001 12</td>
</tr>
<tr>
<td>6204</td>
<td>17.24572 0.4255001 12</td>
</tr>
</tbody>
</table>
The last time point in the list indicates the last time point in the data, either of an event or of a censoring. Both these method mimics each other there is much differences in their estimation. The Figure 2B using Aalen method illustrates of all estimated cumulative hazards in different colours.

Need to calculate the estimated transition probabilities, and optionally the standard errors and/or the co variances of the transition probabilities. The Stacked transition probabilities (an informative ordering of the transition probabilities) are given (Figure2A and 2B) with plotted using Greenwood and Aalen estimator respectively. These figure shows the distance between two adjacent curves represents the probability of being in the corresponding state. The particular order chosen makes it possible to combine the probabilities of recovery and recovery + AE, and of AE and recovery + AE.

Semi-parametric models (A model with transition-specific covariates) show how the prediction of the transition probabilities can be improved by taking covariates at baseline into account. The mstate package supports the analysis of type-specific Cox models. Events are of the same ‘type’ or ‘stratum’ if they share a baseline hazard. In this section, we consider a model in which ‘type’ is equivalent to transition: each transition has its own baseline hazard. The second session of part, we consider a so-called ‘proportional baseline hazards model’. In both models, covariates can have the same effect for all transitions or different effects for different transitions; in the latter case, transition-specific covariates are needed. We refer to this model as the full model.
Table 4: Regression coefficients (and standard errors) for the full model; covariate effects significant at 0.05 and 0.01 levels are indicated with(*).

<table>
<thead>
<tr>
<th></th>
<th>coef</th>
<th>exp(coef)</th>
<th>se(coef)</th>
<th>z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>match.1*</td>
<td>-0.16740</td>
<td>0.84586</td>
<td>0.08530</td>
<td>-1.96</td>
<td>0.04971</td>
</tr>
<tr>
<td>match.2</td>
<td>-0.11056</td>
<td>0.89533</td>
<td>0.07879</td>
<td>-1.40</td>
<td>0.16054</td>
</tr>
<tr>
<td>match.3</td>
<td>0.19559</td>
<td>1.21602</td>
<td>0.22378</td>
<td>0.87</td>
<td>0.38212</td>
</tr>
<tr>
<td>match.4</td>
<td>-0.00346</td>
<td>0.99654</td>
<td>0.18131</td>
<td>-0.02</td>
<td>0.98476</td>
</tr>
<tr>
<td>match.5</td>
<td>0.19044</td>
<td>1.20979</td>
<td>0.15293</td>
<td>1.25</td>
<td>0.21303</td>
</tr>
<tr>
<td>match.6*</td>
<td>0.42575</td>
<td>1.53074</td>
<td>0.21397</td>
<td>1.99</td>
<td>0.04661</td>
</tr>
<tr>
<td>match.7</td>
<td>0.24448</td>
<td>1.27696</td>
<td>0.40481</td>
<td>0.60</td>
<td>0.54588</td>
</tr>
<tr>
<td>match.8</td>
<td>0.12589</td>
<td>1.13416</td>
<td>0.11294</td>
<td>1.11</td>
<td>0.26499</td>
</tr>
<tr>
<td>match.9</td>
<td>-0.41437</td>
<td>0.66075</td>
<td>0.35218</td>
<td>-1.18</td>
<td>0.23936</td>
</tr>
<tr>
<td>match.10</td>
<td>0.00820</td>
<td>1.00823</td>
<td>0.16750</td>
<td>0.05</td>
<td>0.96095</td>
</tr>
<tr>
<td>match.11</td>
<td>-0.30128</td>
<td>0.73987</td>
<td>0.24825</td>
<td>-1.21</td>
<td>0.22490</td>
</tr>
<tr>
<td>match.12*</td>
<td>0.57151</td>
<td>1.77093</td>
<td>0.17942</td>
<td>3.19</td>
<td>0.00145</td>
</tr>
<tr>
<td>proph.1*</td>
<td>-0.36579</td>
<td>0.69365</td>
<td>0.09288</td>
<td>-3.94</td>
<td>8.2e-05</td>
</tr>
<tr>
<td>proph.2*</td>
<td>-0.27760</td>
<td>0.75760</td>
<td>0.08319</td>
<td>-3.34</td>
<td>0.00085</td>
</tr>
<tr>
<td>proph.3</td>
<td>0.38495</td>
<td>1.46955</td>
<td>0.22714</td>
<td>1.69</td>
<td>0.09012</td>
</tr>
<tr>
<td>proph.4</td>
<td>-0.05639</td>
<td>0.94517</td>
<td>0.17875</td>
<td>-0.32</td>
<td>0.75239</td>
</tr>
<tr>
<td>proph.5</td>
<td>-0.28184</td>
<td>0.75439</td>
<td>0.19626</td>
<td>-1.44</td>
<td>0.15098</td>
</tr>
<tr>
<td>proph.6</td>
<td>0.26760</td>
<td>1.30682</td>
<td>0.22087</td>
<td>1.21</td>
<td>0.22568</td>
</tr>
<tr>
<td>proph.7</td>
<td>-0.00757</td>
<td>0.99245</td>
<td>0.37778</td>
<td>-0.02</td>
<td>0.98400</td>
</tr>
<tr>
<td>proph.8</td>
<td>0.12495</td>
<td>1.13309</td>
<td>0.12488</td>
<td>1.00</td>
<td>0.31706</td>
</tr>
<tr>
<td>proph.9</td>
<td>0.15889</td>
<td>1.17221</td>
<td>0.32079</td>
<td>0.50</td>
<td>0.62037</td>
</tr>
<tr>
<td>proph.10</td>
<td>0.32360</td>
<td>1.38209</td>
<td>0.16638</td>
<td>1.94</td>
<td>0.05178</td>
</tr>
<tr>
<td>proph.11</td>
<td>0.01226</td>
<td>1.01234</td>
<td>0.24709</td>
<td>0.05</td>
<td>0.96042</td>
</tr>
<tr>
<td>proph.12</td>
<td>-0.11176</td>
<td>0.89426</td>
<td>0.21739</td>
<td>-0.51</td>
<td>0.60718</td>
</tr>
<tr>
<td>year1.1*</td>
<td>0.40111</td>
<td>1.49348</td>
<td>0.10015</td>
<td>4.01</td>
<td>6.2e-05</td>
</tr>
<tr>
<td>year1.2</td>
<td>0.02298</td>
<td>1.02324</td>
<td>0.08388</td>
<td>0.27</td>
<td>0.78414</td>
</tr>
<tr>
<td>year1.3</td>
<td>0.44194</td>
<td>1.55572</td>
<td>0.24466</td>
<td>1.81</td>
<td>0.07086</td>
</tr>
<tr>
<td>year1.4</td>
<td>-0.35866</td>
<td>0.69861</td>
<td>0.19303</td>
<td>-1.86</td>
<td>0.06316</td>
</tr>
<tr>
<td>year1.5</td>
<td>-0.09469</td>
<td>0.90966</td>
<td>0.19133</td>
<td>-0.49</td>
<td>0.62067</td>
</tr>
<tr>
<td>year1.6</td>
<td>-0.21006</td>
<td>0.81054</td>
<td>0.26343</td>
<td>-0.80</td>
<td>0.42522</td>
</tr>
<tr>
<td>year1.7*</td>
<td>-0.83628</td>
<td>0.43332</td>
<td>0.39828</td>
<td>-2.10</td>
<td>0.03575</td>
</tr>
<tr>
<td>year1.8*</td>
<td>0.52824</td>
<td>1.69594</td>
<td>0.13534</td>
<td>3.90</td>
<td>9.5e-05</td>
</tr>
<tr>
<td>year1.9</td>
<td>-0.31090</td>
<td>0.73279</td>
<td>0.29970</td>
<td>-1.04</td>
<td>0.29956</td>
</tr>
<tr>
<td>year1.10*</td>
<td>-0.64392</td>
<td>0.52523</td>
<td>0.17330</td>
<td>-3.72</td>
<td>0.00020</td>
</tr>
<tr>
<td>year1.11</td>
<td>-0.02429</td>
<td>0.97601</td>
<td>0.25262</td>
<td>-0.10</td>
<td>0.92341</td>
</tr>
<tr>
<td>year1.12</td>
<td>-0.36239</td>
<td>0.69601</td>
<td>0.22839</td>
<td>-1.59</td>
<td>0.11257</td>
</tr>
<tr>
<td>year2.1*</td>
<td>0.52122</td>
<td>1.68409</td>
<td>0.10300</td>
<td>5.06</td>
<td>4.2e-07</td>
</tr>
<tr>
<td>year2.2</td>
<td>-0.11391</td>
<td>0.89234</td>
<td>0.09119</td>
<td>-1.25</td>
<td>0.21162</td>
</tr>
<tr>
<td>year2.3</td>
<td>0.22095</td>
<td>1.24726</td>
<td>0.30204</td>
<td>0.73</td>
<td>0.46445</td>
</tr>
</tbody>
</table>
The estimated regression coefficients of the covariates and their standard errors for each of the transitions are shown in the Table 4. For each covariate, the estimated effects are positive for some transition hazards and negative for others. The use of transition-specific covariates is very convenient to observe such effects.
Also it enables to make a different kind of predictions for individual patients and is interested in dynamic prediction of 10-year relapse-free survival (RFS) probabilities (Table 5) and we can see how these prediction probabilities change as more information about intermediate events becomes known in the course of time. We want to study how 10-year RFS probabilities change when the patient experiences the adverse event 60 days (0.164 years) post-transplant and is recovered from the treatment 80 days (0.219 years) post-transplant.

Table 5: Dynamic prediction of 10-year relapse-free survival (RFS) probabilities for specific patients

<table>
<thead>
<tr>
<th>time</th>
<th>pstate1</th>
<th>pstate2</th>
<th>pstate3</th>
<th>pstate4</th>
<th>pstate5</th>
<th>pstate6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0000000000</td>
<td>0.2027821</td>
<td>0.2011028</td>
<td>0.03643172</td>
<td>0.2243403</td>
<td>0.2202891</td>
</tr>
<tr>
<td>2</td>
<td>0.002737851</td>
<td>0.2028442</td>
<td>0.2011644</td>
<td>0.03642153</td>
<td>0.2242138</td>
<td>0.2203215</td>
</tr>
<tr>
<td>3</td>
<td>0.008213552</td>
<td>0.2030930</td>
<td>0.2014111</td>
<td>0.03638068</td>
<td>0.2237070</td>
<td>0.2204516</td>
</tr>
<tr>
<td>4</td>
<td>0.010951403</td>
<td>0.2033788</td>
<td>0.2016946</td>
<td>0.03634618</td>
<td>0.2232383</td>
<td>0.2206213</td>
</tr>
<tr>
<td>5</td>
<td>0.013689254</td>
<td>0.2040161</td>
<td>0.2023266</td>
<td>0.03626654</td>
<td>0.221685</td>
<td>0.2209954</td>
</tr>
<tr>
<td>6</td>
<td>0.016427105</td>
<td>0.2046623</td>
<td>0.2028231</td>
<td>0.03618690</td>
<td>0.2209705</td>
<td>0.2212890</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>time</th>
<th>se1</th>
<th>se2</th>
<th>se3</th>
<th>se4</th>
<th>se5</th>
<th>se6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.0000000000</td>
<td>0.03251177</td>
<td>0.03348491</td>
<td>0.01310601</td>
<td>0.03201052</td>
<td>0.03621101</td>
</tr>
<tr>
<td>2</td>
<td>0.002737851</td>
<td>0.03252166</td>
<td>0.03349510</td>
<td>0.01310245</td>
<td>0.03200975</td>
<td>0.03621862</td>
</tr>
<tr>
<td>3</td>
<td>0.008213552</td>
<td>0.03256129</td>
<td>0.03353594</td>
<td>0.01308821</td>
<td>0.03200663</td>
<td>0.03624914</td>
</tr>
<tr>
<td>4</td>
<td>0.010951403</td>
<td>0.03260681</td>
<td>0.03358284</td>
<td>0.01307626</td>
<td>0.03200914</td>
<td>0.03628623</td>
</tr>
<tr>
<td>5</td>
<td>0.013689254</td>
<td>0.03270819</td>
<td>0.03368732</td>
<td>0.01304868</td>
<td>0.03201329</td>
<td>0.03636863</td>
</tr>
<tr>
<td>6</td>
<td>0.016427105</td>
<td>0.03281083</td>
<td>0.03377366</td>
<td>0.01302117</td>
<td>0.03200179</td>
<td>0.03644010</td>
</tr>
</tbody>
</table>

Figure 3: Standard errors for the transition probabilities AE to Relapse and AE to Death (starting time: 100 days), both for the full model and the proportional baseline hazards model.
It shows finally, (Figure 3) the standard errors of the transition probabilities from state 3 (AE) at time 100 days to states 5 (Relapse) and 6 (Death), for the full Cox model (non-PH) and for the proportional baseline hazards model (PH) and also shows that the proportional hazards assumption does not always decrease the standard errors of the predictions in either of categories. The main advantage of proportional baseline hazards models is accurately that we obtain such a measure for the impact of intermediate events on the final outcome.

Conclusion

Multi-state models are a very useful tool to answer a wide range of questions in survival analysis, especially in the competing risks aspects. R offers the user the opportunity to explore different kinds of multi-state models and estimate their parameters of interest on the basis of a regular data set containing the times to event of the events of interest and optionally covariate values. The functions in the package are flexible, which means that they can easily be combined with user-written software in cases when models not covered by mstate are studied. In mstate, we confine with non- and semi-parametric models. In this work, it has been explored the different phases of a multi-state analysis: model building, data preparation, exploration of different covariate effects and baseline assumptions, estimation of hazards, transition probabilities and associated standard errors using ebmt data. In particular, it has been explained how predictions can be rationalized with dynamic prediction, if supplementary information becomes acknowledged. This possibility is an important extra feature of multi-state models compared to classical survival models. Moreover, numerous ways of presenting the outcomes in figures have been revealed with this kind of European Group for Blood and Marrow Transplantation data.

Ethical Approval- Not obtained as it is a review

Source of Funding- Self

Conflicts of Interest- None

References

Family Support and Medication Nonadherence among Elderly on Antihypertensives

Melita Sheilini¹, H Manjunatha Hande², Anice George³

¹Asst.Professor-selection grade, Department of Medical Surgical Nursing, Manipal College of Nursing, Manipal, MAHE, Manipal, Udupi District, Karnataka, ²Head, Department of Medicine, Kasturba Hospital, MAHE, Manipal, Udupi District, Karnataka, ³Professor and Dean, Manipal College of Nursing Manipal, MAHE, Manipal, Udupi District, Karnataka

Abstract

Background: Hypertension being the silent killer pose the individuals at risk for adverse health effects and serious complications endangering the life of an individual. Non-adherence to the recommended treatment for hypertension adds to the likelihood of therapeutic failure. Since family play a very important role in the care of elderly, assessment of family support by the health care providers becomes one of the important components of treating elderly on antihypertensives.

Objective: to assess the medication nonadherence among elderly on antihypertensives and to find the influence of family support on medication adherence.

Materials and Method: The total sample for the study included 124 nonadherent elderly hypertensives and were assessed at baseline and followed up at three and six months. During each follow up the participants were assessed for their level of medication adherence and family support. The data were collected using demographic and clinical proforma, MMAS-8 (r=0.83) and family support scale (r=0.92). Ethical clearance was obtained from the Institutional Ethical Committee and Informed consent was obtained from participants.

Results: It was found that the family support does have a significant influence on medication adherence among elderly hypertensives.

Conclusion: Detailed assessment by the health care provider regarding the family support becomes the basis for the management of nonadherent behavior of elderly on antihypertensives.

Keywords: Hypertension, Aged, Medication Adherence, Family

Introduction

Hypertension is increasing rapidly in the Indian populations. As patients are unaware that they have HTN until they develop complications, detection and timely management of hypertension is vital to reduce the incidence of cardiovascular disease. It is estimated that uncontrolled blood pressure increases the risk of ischemic heart disease 3 to 4 fold and the overall cardiovascular risk by 2 to 3 fold. The incidence of stroke increases approximately 3-fold in patients with borderline hypertension and approximately 8-fold in those with definite hypertension. The therapy prescribed for hypertension will control hypertension only if the patient is motivated in the form of having a good family network. The family is the unit of care; it has great importance in effective management of hypertension. The family unit determines therapeutic success or failure including medication adherence. Geriatric being the vulnerable age group demands family support for the individuals on antihypertensives. One of the major issues among these population is medication non-adherence which needs individualized care for overcoming the issue of medication nonadherence.

Materials and Method

The study was carried out among the patients attending the outpatient department of Medicine in
a tertiary care hospital in Karnataka. Nonadherents identified (N=124) were assessed at baseline, three months and six months. During each follow up the participants were assessed for the level of medication adherence and family support. The study aimed to find out the medication nonadherence among elderly on antihypertensives and the influence of family support on medication adherence.

The background information of the participants was collected using the Demographic and Clinical proforma.

Medication adherence was assessed using Morisky Medication Adherence Scale (MMAS-8) (r=0.83) which is a standardised scale authorized to utilize with due norms. MMAS-8 had 8 items focussing on the drug taking behaviour of the individual. The adherence level was categorized as Low adherence (<6), Medium adherence (6-<8) and High adherence (=8). Standardized Kannada version of MMAS-8 was obtained with permission from the original author.

Family support was assessed using the family support scale which consisted of 14 items. Each item had the option as very often -3, fairly often - 2, once in a while -1 and never - 0. The total score ranged between 14-42 and the perceived family support was interpreted as High family support (32-42), Moderate family support (22-31) and Low family support (14-21).

The inclusion criteria for the study were patients of aged 60 years and above with stage I and stage II hypertension with or without comorbidities like Diabetes Mellitus, chronic Ischemic Heart Diseases, dyslipidemias, chronic rheumatism and any other chronic conditions who were able to manage taking medications and were able to read, write, and converse in English/Kannada. Patients with renal failure, acute stroke, acute ischemic heart disease, major psychiatric disorders, dementia or delirium were excluded from the study.

**Results and Discussion**

The majority 85(68.5%) were between the age group of ≥60-70 years, 65 (52.4%) were females, 60(48.4%) were with the educational qualification of > 7th standard - PUC and 53 (42.7%) were currently not employed. Majority 109 (87.9%) were living with their spouse, 68 (54.8%) were having an annual income of INR <12, 000 and 61(49.2%) expressed that their treatment expenses are taken care by their children (Table 1).

Majority 97(78.2%) were on treatment for hypertension for more than a year, 106(85.5%) were having blood pressure under control, 43(34.7%) were overweight and 78 (62.9%) had co-morbidities. Daily an average of 1- 4 medications was taken by 88 (71%) of the patients including the antihypertensives (Table 2).

Out of 124 participants all (100%) were non-adherent to the antihypertensive medications at baseline. Whereas the adherence level improved over a period of time and majority 111(89.5%) and 115(92.7%) were found to be adherent at 3months and 6 months respectively. Subjects in both the low and medium adherence category were considered as non-adherents to anti-hypertensives (Table 3).

This study reported that all the elderly expressed having high family support (Table 4) and the mean scores of family support ranged between 35-39 over a period of six months (Table 5). Since all the participants were non-adherents initially (at baseline assessment), the analysis to find out the influence of family support on medication adherence was performed with the data collected at sixth month (N=124). As there was normal distribution in the data on perceived family support paired ‘t’ test was performed. The findings revealed that the family support has statistically significant influence (t=75.09, p<.001) on the medication adherence behavior of the elderly hypertensives (Table 6).

With regard to the findings of family support, the study conducted at outpatient departments of Ayder Referral Hospital (ARH) and Mekelle General Hospital (MGH) in Ethiopia by Ali, Bekele and Teklay (2014) revealed that presence of family support is significantly related to adherence and Tricia & Robin (2013) found that lack of family support affects individual’s adherence level to the medications. Ofoli, Dankyau, Sule and Lass (2017) showed that family and social support were significant predictors of good medication adherence. All these above findings are contradictory to the present study findings. Study conducted by Osamor (2015) in Idikan community, Ibadan, Nigeria revealed that social support from friends but not from family was significantly associated with good compliance with treatment for hypertension.
### Table 1: Socio Demographic Characteristics of Sample in Frequency and Percentage  \( N=124 \)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \geq 60-70 )</td>
<td>85</td>
<td>68.5</td>
</tr>
<tr>
<td>&gt;70</td>
<td>39</td>
<td>31.5</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>59</td>
<td>47.6</td>
</tr>
<tr>
<td>Female</td>
<td>65</td>
<td>52.4</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>21</td>
<td>16.9</td>
</tr>
<tr>
<td>&lt; 7th standard</td>
<td>32</td>
<td>25.8</td>
</tr>
<tr>
<td>&gt; 7th standard-PUC</td>
<td>60</td>
<td>48.4</td>
</tr>
<tr>
<td>Degree</td>
<td>11</td>
<td>8.9</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>9</td>
<td>7.3</td>
</tr>
<tr>
<td>Non-professional</td>
<td>15</td>
<td>12.1</td>
</tr>
<tr>
<td>Business</td>
<td>9</td>
<td>7.3</td>
</tr>
<tr>
<td>Retired</td>
<td>17</td>
<td>13.7</td>
</tr>
<tr>
<td>Cooli</td>
<td>21</td>
<td>16.9</td>
</tr>
<tr>
<td>Not working</td>
<td>53</td>
<td>42.7</td>
</tr>
<tr>
<td>Living with spouse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>109</td>
<td>87.9</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual income of the family</td>
<td>15</td>
<td>12.1</td>
</tr>
<tr>
<td>&lt;12000</td>
<td>68</td>
<td>54.8</td>
</tr>
<tr>
<td>12000-1 lakh</td>
<td>38</td>
<td>30.6</td>
</tr>
<tr>
<td>&gt;1 lakh-2.5 lakhs</td>
<td>10</td>
<td>8.1</td>
</tr>
<tr>
<td>&gt;2.5 lakhs Finance for the treatment</td>
<td>8</td>
<td>6.5</td>
</tr>
<tr>
<td>Children</td>
<td>61</td>
<td>49.2</td>
</tr>
<tr>
<td>Own</td>
<td>48</td>
<td>38.7</td>
</tr>
<tr>
<td>Spouse</td>
<td>15</td>
<td>12.1</td>
</tr>
</tbody>
</table>

### Table 2: Clinical Variables of Sample in Frequency and Percentage  \( N=124 \)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 months</td>
<td>24</td>
<td>19.4</td>
</tr>
<tr>
<td>6-12 months</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>&gt; 1 year</td>
<td>97</td>
<td>78.2</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controlled</td>
<td>106</td>
<td>85.5</td>
</tr>
<tr>
<td>Uncontrolled</td>
<td>18</td>
<td>14.5</td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt;18.5)</td>
<td>7</td>
<td>5.6</td>
</tr>
<tr>
<td>Normal (18.5-24.9)</td>
<td>70</td>
<td>56.5</td>
</tr>
<tr>
<td>Overweight (25-29.9)</td>
<td>43</td>
<td>34.7</td>
</tr>
<tr>
<td>Obese (&gt;30)</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>Comorbidities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>65</td>
<td>52.4</td>
</tr>
<tr>
<td>Chronic Ischemic Heart Disease</td>
<td>12</td>
<td>9.7</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Chronic rheumatism</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>No comorbidities</td>
<td>46</td>
<td>37.1</td>
</tr>
<tr>
<td>More than one comorbidities</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>88</td>
<td>71</td>
</tr>
<tr>
<td>5-8</td>
<td>33</td>
<td>26.6</td>
</tr>
<tr>
<td>9-12</td>
<td>3</td>
<td>2.4</td>
</tr>
</tbody>
</table>

### Table 3: Adherence to anti-hypertensives in frequency and percentage  \( N=124 \)

<table>
<thead>
<tr>
<th>Level of adherence</th>
<th>Baseline f (%)</th>
<th>At 3 months f (%)</th>
<th>At 6 months f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low adherence (&lt;6)</td>
<td>34 (27.4%)</td>
<td>2 (1.6%)</td>
<td>0</td>
</tr>
<tr>
<td>Medium adherence (6-&lt;8)</td>
<td>90 (72.6%)</td>
<td>11 (8.9%)</td>
<td>9 (7.3%)</td>
</tr>
<tr>
<td>High adherence (≥8)</td>
<td>0</td>
<td>111 (89.5%)</td>
<td>115 (92.7%)</td>
</tr>
</tbody>
</table>
Table 4: Family support at Baseline, 3 months and 6 months

<table>
<thead>
<tr>
<th>Categories of Family support</th>
<th>Baseline f (%)</th>
<th>At 3 months f (%)</th>
<th>At 6 months f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Family support (32-42)</td>
<td>124 (100%)</td>
<td>124 (100%)</td>
<td>124 (100%)</td>
</tr>
<tr>
<td>Moderate Family support (22-31)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low Family support (14-21)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Minimum score 14 and maximum score 42

Table 5: Mean and Standard Deviation of Medication adherence and Family Support at Baseline, 3 months and 6 months

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline Mean (SD)</th>
<th>At 3 months Mean (SD)</th>
<th>At 6 months Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication adherence¹</td>
<td>1.72 (0.44)</td>
<td>2.87 (0.37)</td>
<td>2.92 (0.26)</td>
</tr>
<tr>
<td>Family support²</td>
<td>39.33(4.15)</td>
<td>39.46(3.52)</td>
<td>35.96(5.00)</td>
</tr>
</tbody>
</table>

¹Minimum score 0 and maximum score 8, ²Minimum score 14 and maximum score 42

Table 6: Influence of Family Support on Medication Adherence

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>‘t’ value</th>
<th>df</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication Adherence Family support</td>
<td>4.97</td>
<td>7.38</td>
<td>75.09</td>
<td>123</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Conclusion

As such care of elderly is a challenging issue, the nonadherent behavior of elderly on antihypertensives increases the intensity of the health care concern required towards their management. In helping the elderly to remain adherent to their antihypertensive medications, the mere presence of family member during their visit to the health care facilities will suffice to make elderly remain adherent to their antihypertensive medications. Cooperation of the family is often necessary in fulfilling medical treatment prescribed by a physician.¹⁰,¹¹

Ethical Clearance: The ethical clearance was obtained from the Institutional Ethical Committee (IEC 253/2012) and CTRI registration (CTRI/2017/04/008405) was done. Informed consent was taken from the patients before collecting the data.

Source of Funding: Self

Conflict of Interest: Nil

References

5. Morisky DE, Ang A, Krousel-Wood M WH.


Young People with Physical Disability Talking about Depression

Manoj Mathew P¹, Suja M K²
¹PhD Scholar, ²Associate Professor Department of Social Work, Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham, India

Abstract

The depression among people with disability is a serious health concern as the depressive symptoms are more in people with disability than general population. The objective of this study is to scrutinize the differences between two controlled groups of physical disability a) with depression, b) to examine associations among social relationships, c) emotional factors and socio-demographic variables, d) pattern of peer group interactions, e) depression rate and finally overall functioning. The survey assessed 50 respondents with a physical disability from both gender categories between the age group of 12 years to 19 years. Both convenient and random sampling methods were applied and all the respondents were sustained with in-depth interviews and discussions. People with physical disabilities have manifested similar demographic profiles and social relationship factors during the study. The result shows from the study that, there is an association between depression and disability. The attained results explicit the overall functioning of people with physical disabilities.

Key words: Young People, Depression, Physical Disability, India

Introduction

Depression is a predominant issue with regards to public health and it affects more than 350 million people in the world. Feeling sad isn’t an uncommon factor for everyone feels blue or disappointed at one or the other phases of their routine. This suggests that not all sadness can be categorized as depression. Persisting of the sorrowful state over a considerable period of time following subsequent evoking of disturbance and confusion in a person can be accounted as depression. Depression influences a man’s thought, behavior, emotions and physical prosperity, social impact, biological and psychological factors have vital role in leading a person towards stressful life. A survey conducted by the World Health Organization (WHO) in 2011 among 17 countries shows that 1 in every 20 individuals are depressed.

The people with disability fail to meet the requirements to lead a normal life since they are having limited ability to move or function. Physical illness and depression are closely bonded i.e.; physical illness can be a major cause of depression. Most of the cross sectional studies showed that the people with disability have depressive symptoms. Depressive symptoms are more affecting in people with disability than normal people. There are many factors influencing the reason for being the people with disability are in depression, including the social attitude, environmental barriers, limited to access health services, barriers in accessing education and jobs, less chance to being social, financial problems, abuse and restrictions from family members/guardians. The people with disability experience high level of depression than general population irrespective of age and gender.

This paper presents a detailed investigation regarding the level of depression in both the adolescent boys and girls with physical disability. Studies of the entire relationship between physical disability, depression and gender are a very limited in our society. Most of the studies available in the literature are from western culture, and it is important to study the depression in young people with disability with regards to gender specific in India. Women with disabilities experience more depressive symptoms than males. However, by the age 13, a dramatic shift occurs calling for twice
the number of girls being depressed and unfortunately this persists unto adulthood. This ratio exists regardless of racial or cultural backgrounds. Young people with disability are the ones unintentionally ignored during the programs, policies and courses for them. Their problems thus aren’t addressed and are neither issued even by the programs designed for them. Hence there is limited knowledge about these 2 groups namely adolescent (those between age group of 10 - 18) and by the United Nations as“ youth” (19- 24) as assorted by the UNICEF, subgroups are also prevalent however considering the shared features among these 2 they are brought together.

It is in the hands of the public and government to provide necessary facility and see to it that even the disabled are empowered15. It is a matter of shame that even now children with disabilities are considered backward in studies and despite years of literacy they are denied of their basic right. The belief is that they need to rightly be stressed out to get literate. They also are under the opinion that they need to undergo a lot of pressure and gallons of embarrassments and moreover should be kept away from public. Even the very act of constructing a fleet of stairs makes it clear that the chances are made tough for the disabled. If such minute factors continue over the years, it will prove to hinder a vast majority of the disabled. Thus the resolutions can be brought about by wavering all the evil thoughts in the minds of the society. The promises need to be delivered in a step by step manner and for this initially all the citizens should be educated. One thing to be kept in mind is that all are equal before the law and therefore even the disabled and to benefit with an encouraging society and a prosperous future eclipsing all their fear of collapses amongst other abled citizens. The purpose of the study is to find the level of depression among young people with disability with regards to gender and find suitable solutions to make them to lead a happy normal life. This paper is organized as follows:

Methodology

Sample and Data collection

A field-based survey has used for data collection with both convenience and random sampling of disabled students. Participants were selected from the three schools in the disabled people with the age group of 12 to 19 years. The face-to-face interaction and discussion are held; the students were informed about the opportunity to participate in the field oriented research, focusing on their attitudes towards disability and their overall functioning through their life experience. Only physically disabled students from the rural area were included in this study.

Measurements

Self-made questionnaire has applied for analysis of the study. It contained four sections: namely a) measure demographics, b) academic experience, c) attitudes towards disability and d) emotional factors. To assess the academic performance and school experience, a total of eight questions were used. Two items focus on academic performance and six items are for both school atmosphere experiences. These items were developed based on group discussion with students. To assess the adolescent’s depression, six items have collected from the Kutcher adolescent depression scale developed in 2006. To assess the attitudes towards the disability based on social life experience, 14 items was used with four-point scale, like; (not at all, only slightly, partly and to a great extend). It is also collected from the group during the discussion time. To assess the emotional factors associated with disability, 12 items were collected with 04 points scoring applied, Like; (Never, Often, Quite often and always). Demographics have included age, gender, education and ethnicity.

Data Analysis

The descriptive examinations of the information were led to analyze the sample features. Using SPSS 16.0, data analysis was included descriptive statistics, simple percentage and chi-square test. Chi- square test will help to test the significant deference among the variables.

Results and Discussion

This section deals with the results obtained for study conducted in depression among adolescent boys and girls having physical disability. This study conducted during the period 2015- 2017 at rural districts of Kerala, India. Initially 127 samples were met; Researcher reduced sample size due to the following factors: 1) Individuals were not willing to deliver their experience honestly, 2) Due to the lack of support to respondents from parents/ caretakers/peer group. Since people in domestic circle were not aware of the relevance of research study. With these context researcher has identified the suitable 50
samples that delivers daily living experience.

**Sample Descriptions**

The demographics of the respondents identified by their age, gender, religion, family annual income and education. Demographics of Respondents obtained in the study are summarized in Table 1. The result shows that, most of the respondents are coming in the age group of 16-17 years. Both male and female respondents were recruited from the schools with 25 numbers from each gender. Majority of the respondents, 44% were coming from the Christian religion. 42% of the respondents were coming from Hindu religion and remaining from Muslim. Respondents are living in the rural areas and they are depending agriculture for their daily bread. That can be seen in their family monthly income, most of the respondents (56%) are from middle class family. Only 18% of them are having monthly income of above Rs.10,000. 26% of them are below middle class family and facing financial security. It also shows the poor financial security and accessibility of services from the Government sector. Majority of the respondents (48%) are doing 10th-11th class of education.

### Table 1. Demographics of Respondents

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 – 15 years</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>16- 17 years</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>18- 19 years</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hindu</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>07</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Family monthly Income (Rs.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2000 – 6000</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>6001 – 10000</td>
<td>28</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>Above 10000</td>
<td>09</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>5</td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8th- 9th class</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>10th-11th class</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>12th and at</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

Level of depression based on gender of respondents.
### Table 2. Level of Depression

<table>
<thead>
<tr>
<th>Gender</th>
<th>Level of Depression</th>
<th>Probably not depressed</th>
<th>Probably depressed</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td>15 (60%)</td>
<td>10 (40%)</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>09 (36%)</td>
<td>16 (64%)</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>24 (48%)</td>
<td>26 (52%)</td>
<td>100</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

The Table 2 summarizes the level of depression among male and female in percentage. Majority of the respondents 26 (52%) are probably depressed and 24 (48%) respondents are probably not depressed. But when it comes on the basis of gender, female respondents with physical disability are more depressed (64%), than the male respondents.

**Chi-square test**

A wide sequence of survey suggests that there is a significant relation between gender bias and the subsequent treatment. Table 3 summarizes the Chi-square test obtained for this study. In fact the calculated value which is around 4.326 differs the table value marginally the latter being around 3.841. Thus the concept of null hypothesis is unreliable and alternative hypothesis is preferred. A wide sequence of survey suggests a significant relationship between gender bias and the level of depression.

### Table 3. Chi-square test

<table>
<thead>
<tr>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.326</td>
<td>1</td>
<td>0.002</td>
</tr>
</tbody>
</table>

**Discussion**

Though disabled akin to the abled are able to compass greater heights it is necessary they be provided with possible mental support for they are mostly dependent. To fight all odds and climb the ladder of success they too require tones and tones of support and encouragement. This should inevitably start from their homes. Society too plays a major role in shaping their mindset. The disabled should be aided to waive all the fear of living. Initially measure should be taken to eliminate all the physical, mental, and emotional barriers and equal opportunities should await them in the educational institutions. Education is the whetstone to awareness and therefore society should initially be educated. Partnerships need to be fosters between rehabilitation professionals and community groups so that problems of the disabled adolescents are brought into limelight. All in all, there should be a feeling of confidence instilled in the mindset of the youth to conquer the world.

**Conclusion**

In this paper we have analyzed the depression among people with disability in men and women. Depression being big very common in the modern day world the issues of the victims should be duly considered for them to perform better. The disability and depressive symptoms are related- disability affects their mood, thinking and behavior. People with disability are more affected with depression than general population. Unlike the abled man they will require much of encouragement from the society to shield their anxiety. The socio-cultural attitude towards them also affects their depressive symptoms. An individual with physical inability may have bouts of severe depression and their dreadful thoughts need to put aside for clear idea of the future. As the studies infer the depression rate varies drastically among the females and males and necessary tactics should be taken to avoid the same. The study showed that gender is a key factor that determines the depression in people with disability. The overall studies prove that women with physical disability are more susceptible than men in matters regarding the same proper planning and implementation of the same should avoid any fallies pertaining to disturb their lives. In spite of the methodological limitations of the research study, young women seem by all accounts, to be critical factors for depression among young people with physical disability.
Ethical Issues: This study obtained consent from the young people with physical disability before involving them in this study and inform about the importance of the study.

Source of Funding: Self

Conflict of Interest: Nil

References
2. Salmans S. Depression: questions you have-answers you need: People’s Medical SocietyAllentown, PA; 1995.
Bio-Medical Waste Management at an Academic Hospital: Knowledge and Practice of Hospital Staff

Khajan Singh1, Niti Solanki Gahlot1, Amrit Virk2, Mahima Panigrahi1, Narottam Samdarshi1

1Assistant Professor, 2Prof. and Head, Dept of Comm. Med., Adesh Medical College and Hospital (AMCH), Mohri (Dist.Kurukshetra), Haryana

Abstract

Background: Large volumes of wastes are generated by hospitals as a by-product of variety of health services and procedures. These may be infectious or non-infectious. Hospital staff is constantly exposed to these wastes and is at risk of getting fatal diseases as an occupational hazard. It is not only a legal necessity but also a social responsibility to effectively manage bio-medical waste. Objectives -1. To determine the awareness of hospital staff regarding hospital waste management policy and practices (2016). 2. To relate the practices of hospital waste management to the level of knowledge. 3. To suggest possible remedial measures (if required). Material and Method- The present study was a cross- sectional study, carried out in Adesh Medical College and Hospital (AMCH), Mohri (Dist.Kurukshetra). A total of 296 healthcare professionals consented for the interview (56.9% response rate) which included 80 doctors, 94 nurses, 72 lab technicians and 50 sanitary staff working in AMCH, Mohri (Dist.Kurukshetra), who gave informed consent for their willingness to participate in the study. A self- designed questionnaire, inclusive of items related to socio-demographic data, knowledge and practice of bio-medical waste management (as per 2016 bio-medical waste management guidelines) was used for data collection. The data collected was subjected to statistical analysis using descriptive statistical methods. Findings- Majority of healthcare professionals were ‘male’ i.e. 175 (59%). Most of the healthcare professionals were in the age group 30-40 years i.e. 115 (39%). Among the doctors most were postgraduate i.e. 68 (85%). Majority of nurses were graduate i.e. 72 (77%). Most of the lab technicians had a diploma i.e. 51 (71%) and majority of sanitary staff were educated below matric i.e. 43 (86%). As regards length of service, most of the doctors had more than 10 years of experience i.e. 43 (54%), majority of nurses had 3-5 years of experience i.e. 36 (38%). Among the lab technicians most had length of service of 5-10 years i.e. 41(57%) and majority of the sanitary staff had length of service more than 10 years i.e. 29 (57%). Most of the hospital staff had knowledge regarding BMWM. Majority of hospital staff i.e. 274 (93%) practice waste segregation into different categories. Most of them i.e. 256 (87%) practice colour coding of waste and 215 (73%) use bio-hazard symbol for labelling. Only 136 (46%) of hospital staff maintain waste disposal register. Conclusion- Doctors and nurses have good knowledge and practice of BMW but lab technicians and sanitary staff need regular sensitization.

Keywords: Bio-medical waste, hospital staff, knowledge, practice.

Introduction

Hospitals generate large volumes of wastes as a by-product of variety of health services and procedures which may be infectious or non-infectious. Infectious waste tends to be of smaller volume than non-infectious waste, but once mixed the total unsegregated waste is deemed as infectious which poses a major public health hazard. Hospital staff is constantly exposed to these wastes and is at risk of getting fatal diseases as an occupational hazard. It is not only a legal necessity but also a social responsibility to effectively manage bio-medical waste. The most critical problems associated with hospital wastes are the absence of proper waste...
management, lack of awareness about the health hazards from biomedical wastes, insufficient financial and human resources and poor control of waste disposal. \(^{(1)}\)

To protect the community from various adverse affects of the hospital wastes it is necessary not only to have adequate knowledge about the health hazards of hospital waste, but also to practice proper technique and methods of handling the waste and follow safety measures. With this background, this study was conducted with the main objective of assessing knowledge and practices of doctors, nurses, lab technicians and sanitary staff regarding bio-medical waste management. The objectives of this study are-

1. To determine the awareness of hospital staff regarding hospital waste management policy and practices (2016).
2. To relate the practices of hospital waste management to the level of knowledge.
3. To suggest possible remedial measures (if required).

**Material and method**

The present study was a cross- sectional study, carried out in Adesh Medical College and Hospital (AMCH), Mohri (Dist.Kurukshetra). This is a 600 bedded private tertiary care teaching hospital in Haryana (India). The study was carried out over a period of three months from Dec 2017 to Feb 2018.

A total of 296 healthcare professionals consented for the interview (56.9% response rate) which included 80 doctors, 94 nurses, 72 lab technicians and 50 sanitary staff working in AMCH, Mohri (Dist.Kurukshetra), who gave informed consent for their willingness to participate in the study. They were interviewed and observed for bio-medical waste management (BMWM) practices. Data was collected directly from the study subjects through a pre-designed questionnaire.

**Ethical clearance** - Data collection was started after obtaining approval from the Ethics Committee of Adesh Medical College and Hospital.

**Criteria for selection of subjects**- Staff members working in AMCH, Mohri (Dist.Kurukshetra) participated in the study. The study included doctors, nurses, lab technicians and sanitary staff.

A self- designed questionnaire, inclusive of items related to socio-demographic data, knowledge and practice of bio-medical waste management (as per 2016 bio-medical waste management guidelines) was used for data collection. The data collected was subjected to statistical analysis using descriptive statistical methods. Descriptive statistics was used to describe sample characteristics in terms of frequency and percentage.

**Findings**

The results of the study are presented here under the headings of various parameters considered for the study:-

### Table 1. Distribution of hospital staff according to their socio-demographic profile

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Parameter</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>175</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>121</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 – 30 yrs</td>
<td>44</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>30 – 40 yrs</td>
<td>115</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>40 – 50 yrs</td>
<td>77</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>&gt;50 yrs</td>
<td>59</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doctor P.G.</td>
<td>68</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Diploma</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 1. Distribution of hospital staff according to their socio-demographic profile

<table>
<thead>
<tr>
<th></th>
<th>P.G.</th>
<th>Graduate</th>
<th>Diploma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>-</td>
<td>72</td>
<td>77</td>
</tr>
<tr>
<td>Lab Technicians</td>
<td>-</td>
<td>21</td>
<td>29</td>
</tr>
<tr>
<td>Sanitary Staff</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>10+2</th>
<th>Matric</th>
<th>Below matric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lab Technicians</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sanitary Staff</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>10+2</th>
<th>Matric</th>
<th>Below matric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lab Technicians</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sanitary Staff</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

4. *Length of Service*

<table>
<thead>
<tr>
<th></th>
<th>&lt;3 yrs</th>
<th>3-5 yrs</th>
<th>5-10 yrs</th>
<th>&gt;10 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>06</td>
<td>12</td>
<td>18</td>
<td>43</td>
</tr>
<tr>
<td>Nurses</td>
<td>22</td>
<td>36</td>
<td>29</td>
<td>08</td>
</tr>
<tr>
<td>Lab Technicians</td>
<td>-</td>
<td>15</td>
<td>41</td>
<td>15</td>
</tr>
<tr>
<td>Sanitary Staff</td>
<td>-</td>
<td>11</td>
<td>11</td>
<td>29</td>
</tr>
</tbody>
</table>

*Total years of service in hospital were considered which were not necessarily in the present institute.

Table 1 shows that majority of healthcare professionals were ‘male’ i.e. 175 (59%) and 121 (41%) were ‘females’. Most of the healthcare professionals were in the age group 30-40 years i.e. 115 (39%) followed by 40-50 years age group i.e. 77 (26%), above 50 years of age were 59 (20%) and least were in 20-30 years age group i.e. 44 (15%). Among the doctors most were postgraduate i.e. 68 (85%) and rest 12 (15%) were graduate (MBBS). Majority of nurses were graduate i.e. 72 (77%). Most of the lab technicians had a diploma i.e. 51 (71%) and majority of sanitary staff were educated below matric i.e. 43 (86%). As regards length of service, most of the doctors had more than 10 years of experience i.e. 43 (54%), majority of nurses had 3-5 years of experience i.e. 36 (38%), followed by 5-10 yrs of experience i.e. 29 (31%). Among the lab technicians most had length of service of 5-10 years i.e. 41(57%) and majority of the sanitary staff had length of service more than 10 years i.e. 29 (57%).
Table 2. Distribution of hospital staff according to their knowledge of Bio-Medical Waste Management (BMWM)

<table>
<thead>
<tr>
<th>Knowledge of BMW Management</th>
<th>Doctors</th>
<th>Nurses</th>
<th>Lab technicians</th>
<th>Sanitary Staff</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (80)</td>
<td>%</td>
<td>n (94) %</td>
<td>n (72) %</td>
<td>n (50) %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMWM rules(2016)</td>
<td>62</td>
<td>77</td>
<td>65%</td>
<td>69%</td>
<td>19%</td>
</tr>
<tr>
<td>Colour coding of waste containers</td>
<td>80</td>
<td>100</td>
<td>80%</td>
<td>85%</td>
<td>58%</td>
</tr>
<tr>
<td>Segregation of waste at source</td>
<td>80</td>
<td>100</td>
<td>87%</td>
<td>92%</td>
<td>55%</td>
</tr>
<tr>
<td>Disinfection of hospital waste before disposal</td>
<td>72</td>
<td>90</td>
<td>87%</td>
<td>92%</td>
<td>47%</td>
</tr>
<tr>
<td>Transmission of disease through BMW</td>
<td>77</td>
<td>96</td>
<td>85%</td>
<td>90%</td>
<td>50%</td>
</tr>
<tr>
<td>Employee Education on BMWM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Received training on BMWM</td>
<td>-</td>
<td>-</td>
<td>65%</td>
<td>69%</td>
<td>36%</td>
</tr>
<tr>
<td>Interested in attending training program on BMWM</td>
<td>80</td>
<td>100</td>
<td>94%</td>
<td>100%</td>
<td>57%</td>
</tr>
</tbody>
</table>

The results of table 2 revealed that majority of hospital staff had knowledge regarding colour coding of waste containers i.e. 247 (84%), segregation of waste at source i.e. 243 (82%) and transmission of disease through BMW i.e. 243 (82%). Hospital staff that was aware about disinfection of hospital waste before disposal was 235 (79%). Only 159 (54%) were aware about BMWM rules. Most of the hospital staff i.e. 271 (92%) would like to attend a training program on BMWM. Only 101 (34%) hospital staff reported that hospital had provided annual education on waste management for employees.

Table 3. Practice of Bio-Medical Waste Management (BMWM) by hospital staff

<table>
<thead>
<tr>
<th>Practice of BMW Management</th>
<th>Doctors</th>
<th>Nurses</th>
<th>Lab technicians</th>
<th>Sanitary Staff</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (80)</td>
<td>%</td>
<td>n (94) %</td>
<td>n (72) %</td>
<td>n (50) %</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice segregation of waste in different categories</td>
<td>80</td>
<td>100</td>
<td>87%</td>
<td>92%</td>
<td>67%</td>
</tr>
<tr>
<td>Practice color coding of waste</td>
<td>80</td>
<td>100</td>
<td>87%</td>
<td>92%</td>
<td>57%</td>
</tr>
<tr>
<td>Use of bio hazard symbol for labelling</td>
<td>68</td>
<td>85</td>
<td>72%</td>
<td>77%</td>
<td>46%</td>
</tr>
<tr>
<td>Maintaining waste disposal register</td>
<td>31</td>
<td>39</td>
<td>51%</td>
<td>54%</td>
<td>36%</td>
</tr>
</tbody>
</table>
Table 3 shows that majority of hospital staff i.e. 274 (93%) practice waste segregation into different categories. Most of them i.e. 256 (87%) practice colour coding of waste and 215 (73%) use bio-hazard symbol for labelling. Only 136 (46%) of hospital staff maintain waste disposal register.

Discussion

The study was conducted on a predesigned and pretested questionnaire and a cross-sectional study design was selected. Knowledge and practice of BMWM among technically qualified personnel was high. Doctors and nurses have updated knowledge of BMWM (2016 guidelines). However, amongst lab technicians and sanitary staff, there is inadequate knowledge about the subject and poor concept of BMW. This was similar to findings from other studies.\(^{(2,3)}\) The findings of Waseem Q showed that doctors have adequate knowledge about the hazards of BMW.\(^{(2)}\) The findings of present study were in agreement with Y Saraf whose study shows good level of knowledge among doctors and nurses as compared to ward boys and sweepers.\(^{(3)}\) Low level of knowledge is mainly attributed to poor training facilities and also to relatively low education level of the sanitary staff.

The result of present study when compared with findings of study done by Pandit N. B showed that most of the doctors were aware about the existence of the law related to BMW. Awareness of doctors regarding transmission of diseases associated with BMW was good but knowledge of lab technicians about it was poor.\(^{(4)}\) Majority of doctors and nurses were practicing as per rules of BMWM which is complementary to the results of S Saini et al.\(^{(5)}\) In contrast, the study results of Dr. Joseph et al. suggested that hospital staff did not color code the wastes. Only 15% of hospital staff used label of bio-hazard symbol and only 9% respondents agreed that they maintain waste disposal register.\(^{(6)}\)

Thus, the results show that healthcare professionals with higher education i.e. doctors and nurses have more knowledge and good practices about BMWM as compared to lab technicians and sanitary staff.

Conclusion and Recommendations

The study concludes that hospital staff with higher education i.e. doctors and nurses have updated knowledge about the BMWM as compared to lab technicians and sanitary staff who were not aware about BMWM. The study revealed that lab technicians though have poor knowledge about bio-medical waste act and rules, but most of them have good practice habits. Thus, we can conclude that doctors and nurses have good knowledge and practice of BMW but lab technicians and sanitary staff need regular sensitization. Following recommendations are proposed-

Orientation programs for the new employees of hospital on BMWM.

Training sessions should not become merely one time activity but should be a continuous process.

Apart from hospital staff, patients and their attendants should also be sensitized regularly regarding potential dangers of BMW. Instructions regarding not to mix the general waste with BMW be boldly displayed on charts in local language.

Conflict of Interest - None

Source of Funding - Self

References

Stakeholder Perception of Health Technology Assessment in Industrial Setting

Sowmya Sundararajan¹, Sanjay Pattanshetty², Kiran R Aatre³, Manisha Gore⁴, Ravi Raj Singh Chouhan¹

¹Post Graduate Scholar, Department of Public Health Manipal University, ²Associate Professor, Department of Public Health, Manipal University, ³Program Manager – Robert Bosch Engineering and Business Solutions Pvt. Ltd., ⁴Consultant- Symbiosis Center of Health Care, Faculty of Health and Biomedical Sciences, Symbiosis International University

Abstract

Introduction: Health technology assessment (HTA) is a multidisciplinary process to evaluate the social, economic, organizational and ethical issues of a health intervention or health technology. The main purpose of conducting an assessment is to inform a policy decision making. Objectives: 1. To emphasize on the need of HTA in India. 2. To analyze the application of HTA in various health sectors. Methodology: A qualitative study was done by conducting in-depth interviews with the help of a semi-structured questionnaire from various sectors such as academics, health technology industries and government sectors. Results: The study findings prove that the concept of Health Technology Assessment was familiar to all the participants but was not being implemented by all due to lack of expertise pertaining to the field and resources. Hence there is a need to increase the importance of the topic to help in better decision making when it comes to the health sector. Conclusion: India does not have a formal HTA program due to lack of expertise in the subject and resources. If policy makers are linked to HTA, then the population will be benefitted by this. Although, participating in a HTA consultation can be challenging as well as time consuming, it provides a great window of opportunity to create an impact on the delivery of healthcare in the country.

Keywords: decision making, evidence based medicine, health care, informed decision

Introduction

Health technology assessment (HTA) refers to the systematic evaluation of properties, effects, and/or impacts of health technology. It is a multidisciplinary process which recapitulates evidence about medical, social, monetary and ethical concerns associated with the use of a particular health technology in a methodical, clear and unprejudiced manner.¹

In its Resolution on Health Intervention and Technology Assessment in support of Universal Health Coverage (2013), the World Health Organization suggested that in order to improve healthcare in terms of efficiency, affordability, prioritization and management, the member states need to develop a national framework for HTA and integrate it into frameworks involving health systems research, health professionals’ education, health systems development, and universal health coverage. The organization also urged the member states to collaborate with key stakeholders such as health organizations, academic institutes and such in the country to develop a strategic plan to introduce health interventions and technology assessment research and to seek technical support from its member states and international agencies.

In order to achieve the goal of Universal Health Coverage in India, prioritization in healthcare should take place in an evidence-based and affordable manner. In the current health policy scenario in the country, the keystone is the increasing costs of the various interventions in healthcare and diagnosis. The National...
Health Policy of 2017 seeks to ensure the digitization of the healthcare system and also proposes to establish the National Digital Health Authority (NDHA) to assist in regulating, developing, and deploying digital health across the country. To improve the quality of healthcare in the country, one would require having a sufficient working HTA program in place which should be able to focus on the evidence-based decision making in policies of healthcare. To ensure that the population is being benefitted by this program, it has to be linked to the health policy that is already in place.

This research focuses on the perception of HTA by various stakeholders involved in the health technology sector which fits perfectly given the current HTA scenario in the country. Although, participating in a HTA consultation can be challenging as well as time consuming, it provides a great window of opportunity to create an impact on the delivery of healthcare in the country.

Methodology

A qualitative study was conducted in the state of Karnataka, India (Southern part) across various sectors such as academics, health technology industries and government sectors which were selected by snowball sampling. Data collection was done by conducting in-depth interviews with an open-ended questionnaire. The study was approved by the authors institution and informed consent was obtained from participants before interviews. Transcripts were made and analyzed by MS Word and MS Excel respectively. However, since few of the stakeholders did not oblige to audio-recording of the interviews, hand-written notes were taken which could have led to loss of verbatim.

Results

Excerpts from the interviews:

Importance of HTA

All the individuals included in the study explained that HTA is of utmost importance to improve the healthcare sector in the country and that there is a need to improve HTA. They also attributed the importance to their knowledge about HTA. A majority of the respondents who were from technological industries graded their knowledge on HTA to be average to moderate because they did not have experts in the field to assist them in the process. Academicians and government officials were aware of the theoretical aspects of HTA and reasoned it with the lack of experts in the field and lack of awareness on the topic. As quoted by an academican, “Only theoretically people know what it is. I would say the knowledge is minimal. I think some people will know about what it is. But I don’t think they have experience in HTA as such.”

Improving HTA

Stakeholders’ consultations emerged as one of the best ways to improve HTA, although a few were doubtful about the idea since they were unsure about the differences and the misperceptions that could arise among or between the various sectors involved. A key industrialist gave his opinion stating that, “I think by helping to arrange such consultations on HTA, it will help in better decision making processes. It will also help in making the technology affordable and cost efficient.” Stakeholders are important in order to spread the awareness about HTA and implementing the process in all the procedures undertaken while developing a technological product.

HTA Consultations

All the respondents suggested that consultations have to be done at the beginning of the ideation process before designing the technologies by conducting workshops, conferences or consortium to help in better decision making process. They also suggested that creating a partnership with other organizations having service of HTA will also help in better consultation. However, all the participants agreed that inter-sectoral collaborations was the best way in order to include HTA as part of the healthcare sector and to improve it.

Prerequisites in HTA

All the respondents agreed on having expertise knowledge on HTA as the most important requirement for their organisation to be actively involved in HTA processes including manpower, funding, regular training programs, collaborations and networking with other organizations involved in HTA. More than half of the respondents agreed that problem identification was one of the important steps stated that a detailed situation analysis should be done before designing the product. Apart from the government officials who were unable to respond, the other interviewees suggested that the main
target areas were the target population, geographical location, manpower, market value, affordability and acceptability of the product.

**Discussion**

The study findings prove that the concept of Health Technology Assessment was familiar to all the participants but was not being implemented due to lack of expertise pertaining to the field and resources. Hence, there is a need to increase the importance of the topic in order to help in better decision making when it comes to the health sector. All the participants explained the importance of HTA in order to make informed decisions in terms of health so as to help in providing quality healthcare at affordable prices and since the current status of HTA is inadequate, there is a great demand to take measures to improve and promote HTA. A study done by Henshall and Schuller stated that patient value was the core element during the decision making process and that HTA will help towards a progressive health system decision making which would use evidence based study to make decisions.\(^5\)

Participants explained about the different roles played by the stakeholders with respect to HTA. As reported by one of the respondents, “the companies in the healthcare technology sector mainly focus on the profits. Although this is a duty of the company, the efficiency of the product may sometimes result as an obstacle. The employees in the government sector have to ensure that all the people in the country should have access to quality healthcare at affordable prices.” This will be possible only if there is a proper HTA program in place. Although the academicians are not directly involved in the process of HTA, they are responsible in including the topic in the curriculum in order to impart knowledge on the topic.

All the participants agreed that consultations on HTA have to be done at the beginning itself. It must also be done at different junctions such as ideation process, formation of a guideline for assessment, product designing, rapid assessment for pricing and reimbursement, piloting the technology, scientific advice while developing the product and marketing the product. A public policy statement given by Merck suggested that stakeholders must be involved in all parts of the process in order to improve the credibility of the results obtained.\(^6\)

With respect to the procedures, all the participants agreed that the main requirement was the expert knowledge in the field of HTA. They also emphasized on the need for other resources such as manpower and monetary resources in order to further improve the decision making. Majority of the participants suggested that problem identification was to be done at the beginning of the process itself. This will help in preventing loss of time and resources. However a few participants also mentioned that the severity of the problem is also take into consideration. If the problem is small then only a few changes are made. But if the problem seems quite large then the whole product is re-made.

Strategic planning includes the target areas, cost estimation, market potential and communication strategy. Majority of the participants were aware of the strategy, although the government officials were not able to shed light on this topic. The participants agreed that the target population, geographical location, manpower, market value, affordability and acceptability of the product were the major target areas one had to consider before the product was designed. A study conducted by Giovagnoni et al suggested that since HTA is a multidisciplinary process, no aspect should be overlooked; scientific, medical, ethical, social, legal, and economic. It must be carried out in a way that it involves and is consistent with the other health care and technical processes of the health system involved.\(^7\) While discussing about the cost of the technology, it was put forth that the following areas must be considered; cost of raw material, labor charges, time factor and the transportation charges. L. Gula ´csi et al in their study stated that the cost of a particular technology differs from country to country based on the GDP, status of the health care system, demographic factors, health status of the population in question, standard health practices, reimbursement policies of the medications, insurance costs, reimbursement policies of the medications, insurance costs, and direct and indirect costs.\(^8\) Although one of the participant did emphasize that access to health service is the basic right of any individual and that a cost cannot be put on health. On the topic of market potential, it was suggested by the majority of the participants that it must be identified at the beginning of the process itself in order to ensure the efficiency and the increased usability of the product. This can be done by doing surveys in order to identify the main areas. All the participants suggested that the communication strategy must be done by advertising in conferences, workshops and trade shows. It was also put
forth that the use of key opinion leaders such as medical professionals who will help to talk about the product before it hits the market will also help to increase the market for the said technology.

WHO in its Medical Device Technical Series titled Health Technology Assessment of Medical Devices that was authored by Banken et al suggested that after ascertaining individuals who had a capacity to appreciate HTA, the topic could be gradually introduced and making these individuals the ‘focal points’ of HTA. The focal points could either be in a research organization, government organization, university, or other not for profit agencies that are focused on the use of HTA for policy and decision making. The afore mentioned individuals is then referred to as ‘HTA focal points’ who would pose as ambassadors of the information that would draw attention of policy and/or decision makers.9

Conclusion

One of the strengths of Health Technology Assessment is that it can help in the comparison of medical, surgical, and public health initiatives. If the system is developed with concerns given to the Indian healthcare, including the cultural, ethical, and philosophical considerations that are necessary for the local policy making, these equations can become the basis of decision-making on pricing, reimbursement and future investments that can be useful for the Indian healthcare system. As noted by Virgil, ‘Health is the Greatest Wealth’; economic productivity and prosperity depend on a healthy population. Although healthcare expenditure is considered to be an economic burden in our country, this statement explains the need to consider spending on healthcare as an investment for the economic well-being of the population.10 This can then help the Indian policymakers to make informed choices about choosing the most productive use of investments in the health which will in turn help in the general well-being of the country, by employing rigorous methodologies such as Health Technology Assessment.

Source of Funding: Self

Conflict of Interest: Nil

Ethical Clearance: Institutional Ethical Committee, Kasturba Medical College, Manipal

References

Analysis of Uterus Involution, Lochea Expenditures and Back Pains on the Post Partum Mother Using Bengkung and Gurita

Sandu Siyoto  
Associate Professor of STIKes Surya Mitra Husada Kediri Indonesia

Abstract

Physical changes experienced by the puerperal mother one of them occurs in the uterus that is the involution of the uterus and expenditure lochea. Discomfort that often arises is a back pain. Many mothers use bengkung or guritas after childbirth culture, and still become the pros and cons for health practitioners.

This research uses quantitative and qualitative research. For a quantitative approach, the researcher uses true experimental design. The type of design used is posttest only control group design. Data were collected using high fundus uteri examination sheets, observation sheets and visual observation sheets. The dependent variables in this study were the incidence of uterine involution, lochea expenditure, and intensity of back pain. Researchers use in-depth interview guidelines to explore factors related to the use of bends. The sampling technique used by the researcher is simple random sampling. The number of samples in this study were 27 respondents.

Based on statistical test Chi square test obtained asymp.sig value (0.527)> α (0.05) hence it is concluded that H1 is rejected which means there is no difference of involution of uterus. Based on statistical test kruskall wallis test known that asymp. Sig. (0.735)> α (0.05) it is concluded that H1 is rejected which means there is no difference of lochea dispensation event. Based on statistical test kruskall wallis test known that asymp. Sig. (0.664)> α (0.05) hence it is concluded that H1 is rejected which means there is no difference of back pain occurrence.

In the postpartum mother, the effects of relaxin hormone cause abdominal muscle tone to loosen, ischemia in the myometrium, the presence of autolysis and the effects of the hormone oxytocin causes a sequence of uterine involution events and physiologic lochea excretion in the puerperium. Physiological changes also cause back pain in the puerperal mother.

Keywords: Uterus Involution, Lochea Expenditure, Back Pain, Bengkung, Gurita

Introduction

Physical and psychological changes in the postpartum can cause various discomfort after childbirth. Physical changes that one of them occurs in the uterus is the involution or the process of return of the uterus to its original size and expenditure lochea or puerperal fluid. Discomfort that often arises one of them is pain in the back. For postpartum care, the community can not be separated from cultural factors, and there are many women who use bengkung or gurita after giving birth. It is still a pros and cons for health practitioners.

Many things can affect the use of mothers using bengkung or gurita during childbirth, in addition to hereditary culture. Other factors is the mother’s perception of the benefits of bengkung or gurita that can make lean, comfortable feeling when wearing bengkung / gurita, the mother felt her body more balanced and mother feel more confident.

This study aims to analyze the differences in the incidence of uterine involution, lochea expenditure and back pain in postpartum mothers using bengkung and gurita, and exploring the reasons for using bengkung and gurita in mothers who work as health workers or health education background.
Method

This research uses quantitative and qualitative research. For a quantitative approach, researchers used true experimental design. The type of design used in this pure experimental study is posttest only control group design. The data were collected using the examination sheet to determine the involution of the uterus, the observation sheet for lochia expenditure and visual observation sheet to determine the intensity of back pain in the puerperal mother. The dependent variables in this study were the incidence of uterine involution, lochia excretion, and the intensity of back pain in the puerperal mother.

Result

Here are the result of the research:

a. Analysis of Differences of Uterine Involution

Table 1: Cross tabulation

<table>
<thead>
<tr>
<th>Post partum mother</th>
<th>Uterus involution</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slow</td>
<td>Normal</td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Without using bengkung and gurita</td>
<td>2</td>
<td>7,4</td>
</tr>
<tr>
<td>Bengkung</td>
<td>1</td>
<td>3,7</td>
</tr>
<tr>
<td>Gurita</td>
<td>1</td>
<td>3,7</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>14,8</td>
</tr>
</tbody>
</table>

Table 2: Chi square test table

<table>
<thead>
<tr>
<th>Value</th>
<th>df</th>
<th>Asymp. sig</th>
<th>Exact.Sig. (2-sided)</th>
<th>Exact.Sig(1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson chi square</td>
<td></td>
<td>0,527</td>
<td>0,524</td>
<td>0,5</td>
</tr>
<tr>
<td>Continuity correction</td>
<td></td>
<td>1,000</td>
<td>1,000</td>
<td>-</td>
</tr>
<tr>
<td>Likelihood ratio</td>
<td></td>
<td>0,524</td>
<td>0,539</td>
<td>-</td>
</tr>
<tr>
<td>Fisher’s exact test</td>
<td></td>
<td>1,0</td>
<td>0,5</td>
<td>-</td>
</tr>
<tr>
<td>Linear by linear association</td>
<td></td>
<td>0,539</td>
<td>0,539</td>
<td>-</td>
</tr>
<tr>
<td>N of valid cases</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on chi square table note that the value asymp.sig. or probability value of the occurrence of uterine involution of 0.527. It is known that asymp. Sig. (0.527) > α (0.05) it is concluded that H1 is rejected which means there is no difference of samples.

b. Analysis of Lochia Spending Difference
Table 3: Kruskal wallis test table

<table>
<thead>
<tr>
<th>Sample group</th>
<th>n</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without using bengkung and gurita</td>
<td>9</td>
<td>12.44</td>
</tr>
<tr>
<td>Using bengkung</td>
<td>9</td>
<td>14.67</td>
</tr>
<tr>
<td>Using gurita</td>
<td>9</td>
<td>14.89</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4: Significance table of lochea expenditures

<table>
<thead>
<tr>
<th>Lochea Expenditure</th>
<th>Chi square</th>
<th>Df</th>
<th>Asymp, sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.617</td>
<td>2</td>
<td>0.735</td>
</tr>
</tbody>
</table>

Based on the table note that the value asymp.sig. or the value of significance or probability value of lochea discharge events of 0.735. It is known that asymp. Sig. 0.735 > α (0.05) hence it is concluded that H1 is rejected which means there is no difference in incidence of lochea discharges in the three groups of samples.

c. Analyze Differences of back pain in the puerperal mother

Table 5: Kruskall wallis test table

<table>
<thead>
<tr>
<th>Kelompok Sampel</th>
<th>n</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without using bengkung and gurita</td>
<td>9</td>
<td>15.67</td>
</tr>
<tr>
<td>Using bengkung</td>
<td>9</td>
<td>12.56</td>
</tr>
<tr>
<td>Using gurita</td>
<td>9</td>
<td>13.78</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6: Significance table of back pain

<table>
<thead>
<tr>
<th>Back pain</th>
<th>Chi square</th>
<th>Df</th>
<th>Asymp, sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.820</td>
<td>2</td>
<td>0.664</td>
</tr>
</tbody>
</table>

Based on the table note that the value asymp.sig. or the value of significance or probability value of lochea

Discussion

In the postpartum mother, the effect of relaxin hormone causes abdominal muscle tone to loosen, ischemia in the myometrium, the presence of autolysis and the effects of the hormone oxytocin causes a sequence of physiological uterine involution events in the puerperium (Sulistyowati, 2009). Many factors affect the occurrence of uterine involution, including lactation, early mobilization, nutritional intake, parity, pacifist exercise regularity, and the use of abdominal support (Saleha, 2009).

The results of this study are in line with research conducted by Maryni (2012) which states that the use of bend or stagen does not affect the health status of the mother one of them is the involution of the uterus. Because the stagen works passively to disguise a stretchy abdomen after childbirth.

According to the opinion of researchers if the bengkung or stagen used according to the correct procedure then it will not endanger the health condition of postpartum mothers. Even the results of uterine involution output in this study for mothers who use bengkung or mother who use gurita also did not give a worse result when compared with mothers who did not use bengkung or gurita. And based on the results of research and observation for 14 days in mothers who use bengkung and gurita, the researchers did not find any constraints that mean or even can interfere with the health condition of the puerperal mother and her baby.

The researchers assessed uterine involution on day 14 by measuring the height of the uterine fundus. The researchers also performed a high measurement of fundus on the respondents every 2 days for 14 days.
Normally at day 14 the height of the mother’s fundus is not palpable above symphisis. However, in the sample group of puerperal women who took bengkung, there were two respondents who experienced uterine involution faster than it should be on the day-to-8 high fundus uteri mother is not palpable anymore.

With the involution of the uterus, the outer layer of the decidua surrounding the placental site will be necrotic / dead. The dead decidua will come out together with the remaining liquid called lochea.

Based on the research indicates that the higher the parity lochea expenditure faster. This may be due to the volume and condition of the pores of the uterine blood vessels in the larger multipara so that the expenditure of lochea becomes faster than the mother with the lower parity. The results revealed that the parity of the mother affects the duration of lochea expenditure, the higher the parity the faster the process of lochea expenditure (Cunningham, 2007). Based on the research shows that infants given breast milk alone in the intervention group 1 tend to experience normal and fast lochea expenditure, when compared with infants fed only or breastfed and MPASI. Baby’s sucking will stimulate the smooth muscles of the nipple, this stimulation by the nerve is transmitted to the brain, and then the brain orders the posterior pituitary gland to secrete the hormone oxytocin brought to the innocent muscle of the breast (Saleha, 2009). The oxytocin hormone not only affects the smooth muscle of the breast but also the smooth muscle of the uterus so that the uterus contracts. With a good contraction of the uterus, the expenditure of lochea in the mother who breastfed her baby will become more fluent.

Back pain during childbirth is a common thing experienced by every postpartum mother. Changing the point of body weight during pregnancy third trimester, the hormone relaxin during pregnancy and childbirth causes a back pain. In addition, the muscles and the lower backbone and pelvis that must work hard during the puerperium, whereas the muscles are still weak because of the birth process also contributed to the back pain during the puerperium (Judha, 2012).

Based on observations and interviews conducted by researchers during the research process, postpartum who are in the intervention group that uses bengkung and octopus convey that they use the curve other than due to cultural or customary factors, they use bengkung or octopus because it assumes that the curve or octopus is a tool help to overcome discomfort in the body after the process of pregnancy and childbirth. In addition to supporting the sagging belly and sagging, the puerperal mothers also feel curved or octopus can reduce pain in her back.

**Conclusion**

The results of this study indicate that there is no difference in the incidence of uterine involution, lochea excretion and back pain in the puerperal mother who does not use bengkung and gurita, postpartum mothers who use bengkung and postpartum mother who uses gurita. It cause not many factors can influence the incidence of uterine involution, lochea excretion and back pain in the puerperal mother.

**Ethical Clearance-** Taken from STIKES SURYA MITRA HUSADA KEDIRI

**Source of Funding-** Self

**Conflict of Interest -** Nothing

**References**


17. Ferdina, dkk. 2014. Faktor-faktor yang Mempengaruhi Involusi Uterus. FKM Universitas Muhammadiyah Semarang. Digilib.unimus.ac.id


29. Manuaba, ida Bagus Gede. 2010. Ilmu Kebidanan Penyakit Kandungan dan KB. Jakarta : EGC


32. Masruroh, Siti. 2010. Hubungan pemberian ASI dengan involusi uterus pada ibu post partum. Digilibumy.ac.id diakses pada tanggal 15 September 2017


An Economic Analysis of Jasmine Cultivation in Madurai District, Tamilnadu

S Thangamayan¹, S N Sugumar², S Chandrachud³

¹Assistant Professor, ²Professor and Head, ³Professor, Department of Economics, VELS Institute of Science, Technology and Advanced Studies (Deemed to be University) Chennai

Abstract

Jasmine is one of the oldest fragrant flowers cultivated by man. The flower is used for various purposes viz., making garlands, bouquet, decorating hair of women, religious offering etc. More than 80 jasmine species are found in India, of which only three species are used for commercial cultivation. Its flowers are used for making garlands, adorning hairs of women, in religious and ceremonial functions, and for producing perfumery oil. Its commercial cultivation is confined to Coimbatore, Madurai, (Tamil Nadu); The dry land of the sample farmers is 89.75 acres, and the total wet land is 145.7 acres, cultivated land is 105.45 acres and the remaining on uncultivated land is 78.25 acres in these 4 Blocks, Thirumangalam has 165.4 acres and Solvanthan has 108.5 acres of landholdings. These two Blocks have more than 60 per cent landholdings of the sample farmers. Owing to great diversity climate and other environmental conditions in different parts of the country, the varieties of jasmine cultivated vary from place to place. The Malli, Pitchi and Mullai varieties are mainly cultivated in Madurai District. The reduction in productivity is the highest Thirumangalam and lowest in Melur.

Keywords: Jasmine, Cultivation, Area Productivity.

Introduction

Jasmine is one of the oldest fragrant flowers cultivated by man. The flower is used for various purposes viz., making garlands, bouquet, decorating hair of women, religious offering etc. It is also used for production of Jasmine concrete which is used in cosmetic and perfumery industries. More than 80 jasmine species are found in India, of which only three species are used for commercial cultivation. They are Jasminum sambac (Gundumalli / Madurai Malli), J. auriculatum (Mullai) and J. grandiflorum (Jathimalli / Pitchi). The first two species are mainly cultivated for selling as fresh flowers whereas the last one is cultivated for concrete extraction. Tamil Nadu is the leading producer of jasmine in the country with an annual production of 77247 from the cultivated area of 9360 ha. The flowers produced in the state are being exported to the neighbouring countries viz., Sri Lanka, Singapore, Malaysia and Middle East countries. The major jasmine producing districts of Tamil Nadu are Dindigul, Salem, Madurai, Tirunelveli, Virudhunagar, Trichy, etc.¹ Since the crop requires lots of manpower for harvesting and other operations, only small farmers are cultivating the crop. It is an ideal crop for small farmers whose land holdings are less than 1 acre.

Jasmine: Production Practices

Jasmine (Jasminum species) is one of the leading traditional flowers of India. Its flowers are used for making garlands, adorning hairs of women, in religious and ceremonial functions, and for producing perfumery oil. Its commercial cultivation is confined to Coimbatore, Madurai, Dindigul, Athoor, Nilakottai, Thirumangalam, Kallupalli and Thiruparankundrum (Tamil Nadu); Bangalore, Ballary, Mysore and Kolar (Karnataka); Pune, Aurangabad and Ahmednagar (Maharashtra); Ahmedabad, Anand and Vadodara (Gujarat); Ambala, Gurgaon and Faridabad (Haryana); Kannauj, Jaunpur and Gazipur (Uttar Pradesh); Delhi; Ludhiana, Jalandhar, Patiala and Amritsar (Punjab); Ranaghat, Kolaghat, Panskura and 24-Parganas (West Bengal); Udaipur, Ajmer, Jaipur and Kota (Rajasthan); Hoja, Jorhat, Alnagarh (Assam). However, largest chunk
of areas under jasmine flower production is in Tamil Nadu and Karnataka. The annual production of flowers is worth more than Rs 120 million. Apart from internal trade, fresh flowers of jasmine are exported to Malaysia, Singapore and Sri Lanka.

**Review of Literature**

Edwin Desai B (1969) in his study examined that the level and pattern of investment in Agriculture, described capital in terms of durables and non durables. The non-durable capital included capital invested on major farm equipments, irrigation structure, cattle sheds and farm buildings. The non-durable capital included working capital spend on seeds fertilizers, farm yard manures, pesticides, irrigation and hired human labour.

Paul Samuelson (1973) reveals that the total cost of production includes fixed can variable cost. The fixed cost comprise of expense made on permanent human and animal labour, depreciation of farm implements and machineries, land revenue, rental value of land and interest on permanent investment other than land. The variable cost covers wage paid to hired human labour, cost of seeds, manures and fertilizers, irrigation charges, betterment levy, and miscellaneous cost such as protection charges, cost of gunny bags and interest on variable costs.

Sowmya Sankar B. (2008) explained that jasmine cultivation is one of the most remunerative farming enterprises in India. He focused on marketing costs, marketing margins and price spread in marketing of jasmine, and the producer share in a consumer rupee in jasmine marketing. He found that, the marketing channel in which farmer sell their produce directly to the consumer and hence is no proper link between jasmine demand and supply in both the markets. He concluded that, involvement of growers in export promotion has been minimal in India. Region specific export facilitation centers could be developed considering the concentrations of production of grapes in Karnataka.

**Statement of the Problem**

Madurai district is one of the Agriculture oriented district of Tamil Nadu. The district is blessed with perennial river namely Vaigai and also their tributaries. Most of the people in this district are practicing traditional method of cultivation of cash and commercial crops. It is left to the farmer to seek financial assistance from external sources such as commercial banks, land development banks, co-operatives and governmental agencies, besides non-institutional bodies. This institutional credit plays a key role in Jasmine cultivation in the field of viticulture and to identify the constraints faced by the farmers in availing the institutional finance.

**Objectives**

1. To analyze the trend in area production and productivity of jasmine cultivation in Madurai District.
2. To study the relationship between farm size and productivity.

**Tools of analysis**

The statistical tools are used to analyses the collected data and to interpret the research.

Linear Growth Rate
Semi _log model

**Analysis of the Study**

Farmers And Landholdings - Landholdings differ from period to period and at different places.

**Table: 1: Landholdings (in acres)**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Block Area</th>
<th>Dry land</th>
<th>Wet land</th>
<th>Cultivated land</th>
<th>Uncultivated land</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Thirumangalam</td>
<td>38.8</td>
<td>51.55</td>
<td>31.0</td>
<td>44.05</td>
<td>165.4</td>
</tr>
<tr>
<td>2.</td>
<td>Melur</td>
<td>11.75</td>
<td>20.0</td>
<td>20.90</td>
<td>9.85</td>
<td>62.5</td>
</tr>
<tr>
<td>3.</td>
<td>Usilampatti</td>
<td>17.2</td>
<td>35.55</td>
<td>29.5</td>
<td>8.5</td>
<td>90.75</td>
</tr>
<tr>
<td>4.</td>
<td>Solavanthan</td>
<td>22.0</td>
<td>38.6</td>
<td>24.05</td>
<td>23.85</td>
<td>108.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>89.75</td>
<td>145.7</td>
<td>105.45</td>
<td>86.25</td>
<td>427.15</td>
</tr>
</tbody>
</table>

Source: Sample Survey.
Table 1 shows that the landholdings of the farmers in four Blocks. The dry land of the sample farmers is 89.75 acres, and the total wet land is 145.7 acres, cultivated land is 105.45 acres and the remaining on uncultivated land is 78.25 acres in these 4 Blocks, Thirumangalam has 165.4 acres and Solvanthan has 108.5 acres of landholdings. These two Blocks have more than 60 per cent landholdings of the sample farmers.

Varieties of Jasmine Cultivation

Owing to great diversity climate and other environmental conditions in different parts of the country, the varieties of jasmine cultivated vary from place to place. The Malli, Pitchi and Mullai varieties are mainly cultivated in Madurai District.

Table 2: Varieties of jasmine cultivation

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variety</th>
<th>No. of Farmers</th>
<th>% to total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Malli</td>
<td>52</td>
<td>43.33</td>
</tr>
<tr>
<td>2.</td>
<td>Pitchi</td>
<td>40</td>
<td>33.33</td>
</tr>
<tr>
<td>3.</td>
<td>Mullai</td>
<td>28</td>
<td>23.34</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Sample Survey.

Table 3: Holdings size of farm

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Size of Farm</th>
<th>Block 1</th>
<th>Block 2</th>
<th>Block 3</th>
<th>Block 4</th>
<th>Total</th>
<th>Per cent (100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0 – 0.50</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>2</td>
<td>22</td>
<td>18.4</td>
</tr>
<tr>
<td>2.</td>
<td>0.51 – 1.0</td>
<td>16</td>
<td>10</td>
<td>6</td>
<td>16</td>
<td>48</td>
<td>40</td>
</tr>
<tr>
<td>3.</td>
<td>1.0 – 1.5</td>
<td>4</td>
<td>12</td>
<td>2</td>
<td>6</td>
<td>24</td>
<td>20</td>
</tr>
<tr>
<td>4.</td>
<td>1.6 – 2.0</td>
<td>4</td>
<td>-</td>
<td>6</td>
<td>4</td>
<td>14</td>
<td>11.6</td>
</tr>
<tr>
<td>5.</td>
<td>2.0 – 3.0</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td>8.4</td>
</tr>
<tr>
<td>6.</td>
<td>Above 3</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Sample Survey.

Farmers and Area of Jasmine Cultivated Land

The Study has made an attempt to find out the area of jasmine cultivated land by the sample farmers. The table 2 shows they are of land utilized by the farmers to cultivate Jasmine. It could be understood that almost all the respondents in the study area were variety of jasmine they cultivated. Out of the 120 respondents 52 (43.33 per cent) of Malli, 40 (33.33 per cent) of Pitchi and remaining 28 (23.34 per cent) of Mullai cultivation. It is clear from above table the majority of 43.33 per cent of Malli cultivated in the study area and the second place is 33.33 per cent of Pitchi cultivated in the study area.

Farmers and Yield Per Acre

The large profitability of agriculture increases with the size of holding, profitability being measured by the surplus of output over costs including the imputed value of labour. The table 3 it is shows the yield per acre, that 40 per cent of the farmers have used land of the size of Jasmine cultivation 18.4 per cent of farmers cultivated 0-0.5 acre Jasmine cultivation and 20 per cent of farmers cultivated 1 to 1.5 acres remaining 11.6 per cent cultivated 1.5 to 2 acres and 8.4 per cent and 1.6 per
cent cultivated Jasmine in 2 to 3 acres and above 3 acres respectively.

**Table - 4: Annual yield per acre**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Block Area</th>
<th>Landholdings (in acre)</th>
<th>Average Yield per acre (in tonne)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Thirumangalam</td>
<td>25.00</td>
<td>3642.6</td>
</tr>
<tr>
<td>2.</td>
<td>Melur</td>
<td>37.60</td>
<td>3066.3</td>
</tr>
<tr>
<td>3.</td>
<td>Usilampatti</td>
<td>40.60</td>
<td>1802.0</td>
</tr>
<tr>
<td>4.</td>
<td>Solavanthan</td>
<td>36.00</td>
<td>2500.6</td>
</tr>
</tbody>
</table>

The table-4 shows that the size of land holdings in Thirumangalam Block 25 acres and average yield per acre 3642.6 kg of Jasmine cultivated. It’s the high yield per acre of this area. Melur area cultivated land 37.60 acres, average yield per acre 3066.3 kg of Jasmine cultivation and Usilampatti area cultivated 40.6 acres average yield per acre 1802 kg of Jasmine. It’s very low level of than the other Blocks and Solavanthan Block farmers cultivated land 18 acres average yield per acre 2500 kgs of jasmine cultivated.

**Result Discussion**

**Table - 5. Regression anaysis for farm size and productivity**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Block Area</th>
<th>Constant</th>
<th>Regression co-efficient</th>
<th>S.E. of b</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Thirumangalam</td>
<td>4471.52</td>
<td>-1007.74**</td>
<td>220.18</td>
<td>0.6244</td>
</tr>
<tr>
<td>2.</td>
<td>Melur</td>
<td>3616.04</td>
<td>-162.29**</td>
<td>53.39</td>
<td>0.3705</td>
</tr>
<tr>
<td>3.</td>
<td>Usilampatti</td>
<td>2743.37</td>
<td>-225.1*</td>
<td>110.39</td>
<td>0.1840</td>
</tr>
<tr>
<td>4.</td>
<td>Solvanthan</td>
<td>3703.08</td>
<td>-585.29**</td>
<td>123.56</td>
<td>0.6049</td>
</tr>
</tbody>
</table>

* Significant at 5 per cent level

** Significant at 1 per cent level

Table-5. Reveals that the regression analysis between farm size and productivity. The samples were taken by 60 farmers in 4 Blocks. The regression analysis suggests that an increasing Jasmine cultivated area by 1 acre will reduce the productivity by 1007 kg of Jasmine, in Thirumangalam. However, in Melur if Jasmine cultivated land is by 1 acre, productivity will come down by 162 kg of Jasmine. In the case of Usilampatti has the productivity will be reduced by 225 kg of Jasmine for every acre of land cultivated additional, in Solvanthan productivity will decline by 585 kg of Jasmine for every one acre of land cultivated additionally. In all the four Blocks in inverse relationship between land size and productivity exist. The reduction in productivity is the highest Thirumangalam and lowest in Melure. The regression co-efficient are significant are one per cent level in Thirumangalam, Melur and Solavanthan, only for Usilampatti Block, the regression co-efficient significant at 5 per cent level. Therefore, the declining of productivity area of farm size increases in the statistically significant.

**Table - 6: Average yield per acre**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Landholdings (in acre)</th>
<th>V1</th>
<th>V2</th>
<th>V3</th>
<th>V4</th>
<th>Overall average per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Below 1 acre</td>
<td>(10) 3689.9</td>
<td>(8) 3522.1</td>
<td>(8) 2651.1</td>
<td>(10) 3260.5</td>
<td>3304.8</td>
</tr>
<tr>
<td>2.</td>
<td>Above 1 acre</td>
<td>(5) 2878</td>
<td>(7) 3333.8</td>
<td>(7) 2196</td>
<td>(5) 2501.2</td>
<td>2733.5</td>
</tr>
</tbody>
</table>
The table-6 reveals that the classification of landholdings, below 1 acre having farmer’s cultivated average yield per acre is 3304.8 and above 1 acre farmers cultivated average yield per acre is 2733.5. It was lower in the case of below 1 acre so as the farm size increases yield per acre decreases because irrigation facility low and soil condition differs.

Suggestions

Jasmine growers are to be motivated to form growers association at Micro Level and to meet periodically to discuss the issues relating to jasmine cultivation.

It is suggested that in every jasmine growing districts, in each block a grape growers committee consisting of representative from the Agricultural Department of Tamil Nadu Government, the horticultural board and growers may be formed.

Conclusion

Jasmine plays a vital role in offering significant employment opportunities to the rural people. Hence it deserves a planned and continuous attention. The Jasmine cultivators, traders, exporters, government, and the like would go along way in referring to the share of Indian Jasmine in both domestic and foreign markets. The present study has brought into focus the various issues relating to the cultivation aspects of Jasmine. The policy implications suggested, if properly implemented may result in increased revenue for the nation and for the people concerned.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest : Nil

References

Effect of Mulligan’s Pain Release Phenomenon with Kinesiotaping in Chronic Patellofemoral Osteoarthritis

Nikhil Bhosale¹, Smita B Kanase², Khushboo Bathia²
¹Physiotherapist, Faculty of Physiotherapy, KIMS ’Deemed to be’ University, Karad, Maharashtra, India, ²Assistant Professor, Department of Musculoskeletal Sciences, Krishna College of Physiotherapy, KIMS ‘deemed to be’ University, Karad, Maharashtra, India

Abstract

Objective: To find out effect of Mulligan’s Pain release phenomenon with kinesiotaping in chronic patellofemoral osteoarthritis. Settings and Design: A comparative study was done with a pre and post test study design on 30 subjects at Krishna Institute of Medical sciences Deemed to be university, Physiotherapy OPD, Karad. Method and Materials: 30 subjects fulfilling the inclusion criteria and willing to participate in the study were divided into 2 groups by Simple random sampling. 15 subjects in each group. Each group have undergone the Treatment for 4 weeks; treatment sessions were given every alternate day. Group A-PRP with Kinesiotaping, Group B-Conventional therapy. Both the groups received ultrasound and VMO strengthening in common. Statistical Analysis:- Data analysis was done using paired t test within the groups and unpaired t test between group comparisons. Results: the within group comparison showed extremely significant difference in both the groups (p<0.0001) for V AS and WOMAC. Unpaired t test between groups showed extremely significant difference post-test in V AS and WOMAC (p<0.0001). The comparison of means showed improvement in group A (PRP+ kinesiotaping) as compared to group B (conventional therapy). Conclusion:- Through the study it was concluded that, both group management was effective but PRP with kinesiotaping showed more improvement in pain and improving the functional limitations in subjects with chronic patellofemoral OA.

Keywords: - Chronic Patellofemoral Osteoarthritis, Kinesiotaping, Pain Release Phenomenon (PRP), Conventional Therapy.

Introduction

Osteoarthritis (OA) is the most common form of arthritis, affecting millions of people and is also the leading cause of chronic disability. It commonly occurs in weight bearing joints like the hip and knee and is most commonly seen in the middle age to old age group. In India, the prevalence rate of Osteoarthritis of the Knee is around 22% - 39% and is observed to increase in the coming decade. The patient may describe arthritis as severely excruciating pain, debilitating and in severe stages, incapacitating. The signs and symptoms for osteoarthritis are: Pain, Decreased range of motion, Sounds, Difficult and painful mobilization, Morphological deformities. The pain in chronic patellofemoral pain is aggravated by daily activities of our life like squatting, rising from sitting or stair climbing. Physiotherapy treatment for the chronic patellofemoral osteoarthritis includes electrotherapy and exercise therapy- Supervised strengthening exercises and manual therapy. There is paucity of literature for newer and better techniques for the severe kind of pain state i.e.; the pain of chronic osteoarthritic knee

Kinesiotaping:-
It is a thin stretchy tape applied in various techniques like: I shaped, y shaped and x shaped application.

Correspondence author:
Nikhil Bhosale,
Physiotherapist, Faculty of Physiotherapy, KIMS ‘Deemed to be’ university, Karad, Maharashtra, India.
Email: - nikhilbhosale90@gmail.com
Phone no: - 8087724872.
patellofemoral joint is affected by the malalignment of the extensor mechanism. The KTG, 5-cm wide elastic tapes can be applied on the quadriceps femoris and the gastrocnemius in cases where the patient felt pain when the knee joint is extended. The tapes should be replaced with new ones at each treatment session. Muscle technique of kinesio tape application can be used.

**Pain release phenomenon**

Brian Mulligan has introduced a newer manual technique for managing Chronic pain which is called as Pain Release Phenomenon Techniques (PRPS). In this technique, joint compression, is used for patellofemoral knee joint as the pain provoking stimuli and the stimuli is maintained for 15-20 seconds. If indicated, the pain will reduce in this period.

The aim was to find out the effect of pain release phenomenon with kinesiotaping in chronic patellofemoral osteoarthritis. As of it is a new treatment approach for the sake of bringing out more specific treatment regimes for such conditions.

**Materials and Method**

The Study Protocol Was Presented For Approval Infront Of The Protocol Committee And Institutional Ethical Committee Of KIMSDU Karad. A Comparative study was done using, Pre and post-test design with sample size of 30 subjects. The subjects were divided into 2 groups by Simple random sampling. Each group consisted of 15 subjects. Each subject was screened as per inclusion and exclusion criteria and they were informed about the study and intervention. Before proceeding to intervention a written consent was taken from them. Intervention duration was 4 weeks for each group with alternate day sessions. Treatment for Group A- PRP with Kinesio Taping and Group B-Conventional Therapy Regime. Both the groups have received ultrasound (-mode-continuous, intensity-1W/cm2, duration- 7minutes) and VMO strengthening in common. Baseline assessment was taken using Visual Analogue Scale (VAS), and Functional Disability Index by WOMAC.

**Intervention:**

**Kinesiotaping:** - Kinesiology tape is a thin, stretchy, elastic cotton strip with an acrylic adhesive. In patellofemoral osteoarthritis, the patellofemoral joint is affected by the malalignment of the extensor mechanism. The KTG, 5-cm wide elastic tapes was applied on the quadriceps femoris and the gastrocnemius in cases where the patient felt pain when the knee joint is extended. The tape was replaced with new ones at each treatment session.

The Pain Release Phenomenon Techniques (PRPS):- For knee pain, Pain release phenomenon was given by compressing the patella against the femoral condyles and the knee joint was moved in flexion and extension by maintaining the compression for 15 seconds. PRPS is a manual therapy technique introduced by Brian Mulligan for the chronic pain management.

**Data Analysis**

**Gender:**

Table no 1: Gender distribution

<table>
<thead>
<tr>
<th></th>
<th>GROUP A</th>
<th>GROUP B</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>8</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>FEMALE</td>
<td>7</td>
<td>6</td>
<td>13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

The gender distribution shows that there were 17 male and 13 female participants in this study. The difference was considered as statistically not significant.

**Age**

Table no 2: Mean age

<table>
<thead>
<tr>
<th></th>
<th>GROUP A</th>
<th>GROUP B</th>
</tr>
</thead>
<tbody>
<tr>
<td>62.46±6.08</td>
<td>53.53±9.59</td>
<td></td>
</tr>
</tbody>
</table>

The graph shows that the mean age of the subjects in group A was 64.46 and in group B was 53.53.

**Side Affected**

Table no 3: Side affected

<table>
<thead>
<tr>
<th>GROUP</th>
<th>RIGHT</th>
<th>LEFT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>TOTAL</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>
The table shows that in group A, 9 subjects had their right side affected while 6 were left. In group B, 6 subjects had their right side affected while 9 had their left side affected.

Visual analogue scale:

**Table no. 4: Comparison of pre and post VAS within groups**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE TEST</th>
<th>POST TEST</th>
<th>P VALUE</th>
<th>T VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8.06 ± 0.79</td>
<td>3.67 ± 0.8</td>
<td>&lt;0.0001</td>
<td>18.47</td>
</tr>
<tr>
<td>B</td>
<td>7.67 ± 0.77</td>
<td>4.96 ± 0.71</td>
<td>&lt;0.0001</td>
<td>12.65</td>
</tr>
</tbody>
</table>

The table shows the comparison of mean and standard deviation of pre and post values of Group A and Group B. In the Group A, the mean VAS score on pre intervention was 8.06 ± 0.79 which was reduced to a mean of 3.67 ± 0.8 post sessions. The P value by Paired t test was found to be <0.0001 which is extremely significant. In Group B, the mean VAS score on pre intervention was 7.67 ± 0.77 which was reduced to a mean of 4.96 ± 0.71 post intervention. The P value by Paired t test found to be <0.0001 which is extremely significant.

**Table no 5: Comparison of pre-pre and post-post VAS between groups**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE TEST</th>
<th>POST TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>8.06 ± 0.79</td>
<td>3.67 ± 0.8</td>
</tr>
<tr>
<td>B</td>
<td>7.67 ± 0.77</td>
<td>4.96 ± 0.71</td>
</tr>
<tr>
<td>P VALUE</td>
<td>0.1900</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>T VALUE</td>
<td>1.343</td>
<td>4.640</td>
</tr>
</tbody>
</table>

On comparing the pre interventional values, the results between the two groups using unpaired t test revealed that there was no statistically significant difference seen with p values of 0.1900. While on comparing the post session values, the results between the two groups using unpaired t test revealed that there was extremely significant difference seen with p values of <0.0001. Group A improved more than Group B. Pain reduction was more in group A than Group B.

WOMAC Scale

**Table no. 6: Comparison of pre and post WOMAC within groups**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE TEST</th>
<th>POST TEST</th>
<th>P VALUE</th>
<th>T VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>36.66 ± 7.91</td>
<td>18.59 ± 8.43</td>
<td>&lt;0.0001</td>
<td>12.29</td>
</tr>
<tr>
<td>B</td>
<td>39.83 ± 7.93</td>
<td>29.09 ± 5.65</td>
<td>&lt;0.0001</td>
<td>8.57</td>
</tr>
</tbody>
</table>

The table also shows the comparison of mean and standard deviation of pre and post values of Group A and Group B. In the Group A, the mean WOMAC score on pre intervention was 36.66 ± 7.91 which was reduced to a mean of 18.59 ± 8.43 post intervention. The P value by Paired t test was found to be <0.0001 which is extremely significant. In Group B, the mean WOMAC score on pre intervention was 39.83 ± 7.93 which was reduced to a mean of 29.09 ± 5.65 post intervention. The P value by Paired t test found to be <0.0001 which is extremely significant. The within group comparison should that WOMAC score improved in both the groups post interventional.

**Table no 7: Comparison of pre-pre and post-post WOMAC between groups**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>PRE TEST</th>
<th>POST TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>36.66 ± 7.91</td>
<td>18.59 ± 8.43</td>
</tr>
<tr>
<td>B</td>
<td>39.83 ± 7.93</td>
<td>29.09 ± 5.65</td>
</tr>
<tr>
<td>P VALUE</td>
<td>0.2831</td>
<td>0.0004</td>
</tr>
<tr>
<td>T VALUE</td>
<td>1.094</td>
<td>4.002</td>
</tr>
</tbody>
</table>

On comparing the pre interventional values, the results between the two groups using unpaired t test revealed that there was no statistically significant difference in pre interventional score for both the groups. While on comparing the post treatment values, the results between the two groups using unpaired t test revealed that there was statistically significant difference with p values of 0.0004. The between group comparison showed that WOMAC score improved in group A as compared to group B.

**Discussion**

Osteoarthritis (OA) is the most common form of arthritis, affecting millions of people and is also the
leading cause of chronic disability.

It commonly occurs in weight bearing joints like the hip and knee and is most commonly seen in the middle age to old age group. In India, the prevalence rate of Osteoarthritis of the Knee is around 22% - 39% and is observed to increase in the coming decade.

Conventional therapy treatment has been in practice since many years now (conventional treatment includes quadriceps strengthening focusing on VMO, ultrasound and isometrics). There is a need for new innovative treatment approaches in order to improve functional status and improve quality of life and functional status of the patients. The present study was conducted with the aim to find out effect of new combination treatment for managing patellofemoral joint osteoarthritis.

PRP technique is a manual therapy technique for chronic pain management in the extremities. In this technique, joint compression, is used as the pain provoking stimuli and the stimuli is maintained for 15-20 seconds. If indicated, the pain will reduce in this period

The combined effect of this treatment approach makes this newer technique more of its own.

The present study shows that pain was reduced in both the groups after 4 weeks of treatment but the decrease in pain was more in group A receiving PRP and Kinesiotaping. The findings of present study is supported by other study by Sana Shahid stating that Pain release phenomenon is an effective technique in reducing pain and improving function of knee in patients with patellofemoral pain.

Also the functional status of the subjects in present study improved in Group A as compared to Group B. As pain is most debilitating factor in patellofemoral osteoarthritis, reduction in pain in subjects of present study has helped in improving the functional score

Kinesiotaping has several effects. Kinesiotape assists and improve the body's natural healing mechanism. It helps to improve fluid circulation, decrease pain, improves muscle strength, helps in joint proprioception. The application of kinesiotape helps in relieving physical and neurological pain. Pain receptors are present under the skin. The lifting action done by application of kinesiotape helps in relieving the pressure over this pain receptors thus reducing pain. The same mechanism has helped the participants in group A receiving kinesiotaping over extensor compartment of knee, thus helping them to decrease pain and improve functional abilities.

**Conclusion**

This study concluded that PRP (pain release phenomenon) with kinesiotaping is effective in reducing pain and improving the functional limitations caused by the chronic pain state in subjects with chronic patellofemoral osteoarthritis.

**Conflict of Interest:** No conflict of interest

**Source of Funding:** Self

**Ethical Clearance:** Ethical clearance was taken from the University Ethical committee of KIMSDU, Karad.

**References**

Childhood Immunization Coverage and Factors Associated with it among Urban Slum Population in a South Indian City

Akshay Salgar¹, Satyajit Pattnaik¹, Samina Ausvi², Dhananjaya Sharma³

¹Associate Professor, ²Assistant Professor, ³Professor & HOD, Community Medicine, Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh

Abstract

Background: Immunisation coverage in slums of urban areas was found to be low in comparison to non-slum areas. The present study was undertaken to determine the immunisation coverage among 12-23 months children in the slum of an urban area. Further attempt was also made to determine the factors responsible for complete immunisation among these children.

Materials and method: This cross-sectional study was carried in 30 slums of Srikakulam Municipal area in north east Andhra Pradesh. A 30 X 7 cluster survey method as suggested by WHO was adopted. Data were also collected on the socio demographic details.

Results: Out of 210 children surveyed, 180 (85.7%) were found to be completely immunised. The dropout rate from Pentavalent 1 to Pentavalent 3 was 4.32%. The odds for child receiving complete immunisation were more for girls and increases with mother’s education. Mothers who stay at home are more likely to complete immunisation for their children. Family with more members had a greater odd for complete immunization.

Conclusion: Many socio demographic factors influence the uptake of immunization among children in urban slums. Periodic local survey is needed to identify these factors and take remedial measures to improve immunisation coverage.

Keywords: Immunisation coverage, determinants, urban poor, slum, children

Introduction

Childhood vaccination is essential to prevent many vaccine preventable diseases. In view of this India started the Expanded Programme of Immunization in 1971, which was scaled up to Universal Immunization Programme (UIP) in 1984.¹ Under UIP, vaccine is given against six vaccine preventable diseases (VPDs). The Rapid Survey on Children (RSOC) undertaken by the Ministry of Women and Child Development and UNICEF between November 2013 and May 2014 showed that 65.3% of children (12-23 months) are fully immunised for India as a whole and 72% coverage among those living in urban areas. ² As per National family Health Survey (NFHS)-4, fully immunised children in the age group of 12-23 months in urban area of Andhra Pradesh are only sixty percent.³

The urban data are usually an aggregate of urban slum and non-slum areas that masks the true picture about slum areas. In a study done in Hyderabad, the proportion of fully immunised children of migrant households living in slums (66.5%) was found to be lower than fully immunization status of the whole city (including slum and non-slum) of Hyderabad (71.3%).⁴

Immunisation coverage is also affected by several individual characteristics such as gender of the child, literacy of mother, socio-economic status of the family.

Corresponding Author:
Dr. Satyajit Pattnaik,
Associate Professor, Community Medicine
Great Eastern Medical School and Hospital,
Ragolu Srikakulam -532484, Andhra Pradesh.
Email: drsatyajitpattnaik@gmail.com
Cell no. 9444189003
The present study was planned to evaluate the immunization coverage among children aged 12-23 months among slum population in Srikakulam municipal area in the north east region of Andhra Pradesh. Further the study aims to determine the factors which are associated with complete immunization among the slum population of Srikakulam town.

**Materials and Method**

**Study setting and study population**

The cross-sectional study was conducted in the municipal corporation area of Srikakulam city situated in the north eastern part of the state of Andhra Pradesh. Srikakulam city has a population of 1.47 lakhs as per Census 2011. There are 63 slums in the municipal area with a total population of 43,009, which constitutes around 30% of the total population.

**Sampling Procedure**

A 30 by 7 cluster sampling method, as suggested by WHO for estimating coverage evaluation of routine immunization, was adopted. Selection of household was done by following multistage sampling (two stage). In the first stage, 30 slums were selected from 63 slums by probability proportionate to size method. Then in each selected slum, one street was selected randomly. Survey was started from one end of the street and continued till seven children in the age group of 12-23 months were surveyed. If the number fell short, the next street was taken up. In any household, only one eligible child was selected.

The data were collected between 1st September 2018 and 31st October 2018 (Two months). The data collection team consisted of one supervisor and one MSW (Medical social worker). The field investigators were trained for one day before the start of the survey on various aspects of the survey such as immunisation schedule, consent procedure, selection of street and houses and data collection using the survey questionnaire. Information about vaccination was collected from immunisation card. If no card was available, mother’s recall about past vaccination was obtained. Many socio demographic details of the households were also collected like, religion, caste, type of family, type of house, educational and occupational history of mother and father, SES status etc.

**Operational Definitions**

- **Fully immunised**: A child who received one dose of BCG and measles and three doses of pentavalent and OPV.
- **Partially Immunised**: A child who has received at least one vaccine, but not all.
- **Not immunised**: Who has not received any vaccine.

**Ethical Clearance**: Ethical clearance from the Institutional Human Ethics Committee was obtained prior to starting of the study. The survey was conducted after obtaining prior verbal informed consent from the parents.

**Statistical analysis**

Data were fed into an excel worksheet and analysed using Epi Info (version 7.1.5, Centers for Disease Control and Prevention, Atlanta, GA, USA). Binary logistic regression analysis was performed with each of the socio-demographic indicators as independent variables and outcome (fully immunised or not) as dependent variable. Adjusted odds ratio was also calculated taking all socio demographic characteristics as independent variable and immunization status as the dependent variable. The significance of adjusted odds ratio was determined by using Wald test.

**Results**

A total of 210 children (101, 48.1% boys and 109, 51.9% girls) from 30 slums were surveyed.

**Sociodemographic Characteristics**

Most of the children were Hindus (89.5%). Majority (58.1%) children belong to joint family. Regarding the education of the mother only 5.7% were illiterate and most of them (68.1%) have studied up to 12th standard. Similarly, among the father of the children, only 7.6% were illiterate and 61.9% had studied up to 12th standard. Most (91.4%) of the mothers were homemaker while majority (57.6%) of the fathers were wage earners.

**Immunization Coverage Rate**

Table No.1 depicts the coverage of different vaccines. Most of the vaccine had a coverage of more than 95% excluding Hepatitis B at birth (87.6%) and pentavalent and OPV 3 (94.7%). The dropout rate from
Pentavalent 1 to Pentavalent 3 is 4.32%.

**Table No. 1 Coverage of different vaccines**

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>No. immunized (%)</th>
<th>No. Not immunized (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td>200 (95.3)</td>
<td>10 (4.7)</td>
</tr>
<tr>
<td>OPV (0 dose)</td>
<td>209 (99.5)</td>
<td>01 (0.5)</td>
</tr>
<tr>
<td>Hepatitis B</td>
<td>184 (87.6)</td>
<td>26 (12.4)</td>
</tr>
<tr>
<td>Pentavalent 1</td>
<td>208 (99.1)</td>
<td>02 (0.9)</td>
</tr>
<tr>
<td>OPV 1</td>
<td>208 (99.1)</td>
<td>02 (0.9)</td>
</tr>
<tr>
<td>Pentavalent 2</td>
<td>209 (99.5)</td>
<td>01 (0.5)</td>
</tr>
<tr>
<td>OPV 2</td>
<td>209 (99.5)</td>
<td>01 (0.5)</td>
</tr>
<tr>
<td>Pentavalent 3</td>
<td>199 (94.7)</td>
<td>11(05.3)</td>
</tr>
<tr>
<td>OPV 3</td>
<td>199 (94.7)</td>
<td>11(05.3)</td>
</tr>
<tr>
<td>Measles</td>
<td>201 (95.7)</td>
<td>09 (4.3)</td>
</tr>
</tbody>
</table>

Factors associated with complete immunization

Table No.2 presents the various factors which determine the status of complete immunisation among the children. The association were expressed in crude as well as adjusted odds ratio with confidence interval. The statistical significance was determined by p value less than 0.05. The odds for being completely vaccinated were found to be high for female children, but it is not significant. Similarly, the odds for being completely vaccinated were found to be high for children in family with more members. This was statistically found to be significant (p value 0.03). Further, parents who are more educated seem to immunise their children completely. Homemaker mothers’ children are better placed and are more likely to be fully vaccinated in comparison to children whose mother work outside home. Although this was not found to be statistically significant.

**Table No.2 Determinants of complete immunization**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Completely Immunized (%)</th>
<th>Partially/Not Immunized (%)</th>
<th>Unadjusted OR (95% CI) P Value</th>
<th>Adjusted OR (95% CI) P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>87(86.1)</td>
<td>14(13.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Girls</td>
<td>93(85.3)</td>
<td>16(14.7)</td>
<td>1.069(0.493 – 2.320)</td>
<td>1.249(0.540 – 2.891)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>0.866</td>
<td>0.604</td>
</tr>
<tr>
<td>OBC</td>
<td>117(83.6)</td>
<td>23(16.4)</td>
<td>1.605(0.616 – 4.186)</td>
<td>1.551(0.548 – 4.388)</td>
</tr>
<tr>
<td>Gen</td>
<td>14(93.3)</td>
<td>01(06.7)</td>
<td>0.583(0.065 – 5.258)</td>
<td>0.677(0.063 – 7.257)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.432</td>
<td>0.570</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>160(85.1)</td>
<td>28(14.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td>20(90.9)</td>
<td>02(09.1)</td>
<td>0.571(0.126 – 2.581)</td>
<td>0.791(0.161 – 3.890)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.467</td>
<td>0.773</td>
</tr>
<tr>
<td>Family Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 5</td>
<td>82(91.1)</td>
<td>08(08.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt;5</td>
<td>98(81.7)</td>
<td>22(18.3)</td>
<td>2.301(0.973 – 5.442)</td>
<td>0.444(0.036 – 5.483)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.058</td>
<td>0.527</td>
</tr>
<tr>
<td>Family Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint</td>
<td>99(81.1)</td>
<td>23(18.9)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nuclear</td>
<td>81(92.0)</td>
<td>07(08.0)</td>
<td>0.372(0.152 – 0.911)</td>
<td>0.180(0.014 – 2.381)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.030</td>
<td>0.193</td>
</tr>
</tbody>
</table>
Table No. 2 Determinants of complete immunization

<table>
<thead>
<tr>
<th></th>
<th>Illiterate</th>
<th>02 (16.7)</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mother’s Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 12th Std.</td>
<td>10 (83.3)</td>
<td>2 (16.7)</td>
<td>0.630 (0.127 – 3.135)</td>
<td>0.545 (0.093 – 3.193)</td>
</tr>
<tr>
<td>College &amp; above</td>
<td>4 (50)</td>
<td>1 (10)</td>
<td>1.395 (0.269 – 7.248)</td>
<td>1.407 (0.202 – 9.806)</td>
</tr>
<tr>
<td><strong>Father’s Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 12th Std.</td>
<td>14 (87.5)</td>
<td>2 (12.5)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>College &amp; above</td>
<td>55 (85.9)</td>
<td>12 (14.1)</td>
<td>1.145 (0.222 – 5.908)</td>
<td>0.560 (0.078 – 4.000)</td>
</tr>
<tr>
<td><strong>Mother’s occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Homemaker</td>
<td>163 (84.9)</td>
<td>29 (15.1)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Working</td>
<td>17 (94.4)</td>
<td>1 (5.6)</td>
<td>0.331 (0.042 – 2.581)</td>
<td>0.275 (0.032 – 2.373)</td>
</tr>
<tr>
<td><strong>Father’s occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wage Earner</td>
<td>106 (87.6)</td>
<td>15 (12.4)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Salary Earner/Business</td>
<td>74 (83.1)</td>
<td>15 (16.9)</td>
<td>0.698 (0.322 – 1.515)</td>
<td>1.153 (0.417 – 3.190)</td>
</tr>
<tr>
<td><strong>SES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class I</td>
<td>06 (85.7)</td>
<td>1 (14.3)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Class II</td>
<td>13 (76.5)</td>
<td>4 (23.5)</td>
<td>1.846 (0.168 – 20.255)</td>
<td>0.916 (0.068 – 12.344)</td>
</tr>
<tr>
<td>Class III</td>
<td>44 (89.8)</td>
<td>0 (10.2)</td>
<td>0.682 (0.068 – 6.871)</td>
<td>0.408 (0.035 – 4.820)</td>
</tr>
<tr>
<td>Class IV</td>
<td>77 (84.6)</td>
<td>14 (15.4)</td>
<td>1.091 (0.122 – 9.770)</td>
<td>0.701 (0.063 – 7.779)</td>
</tr>
<tr>
<td>Class V</td>
<td>40 (87.0)</td>
<td>6 (13.0)</td>
<td>0.9 (0.092 – 8.837)</td>
<td>0.402 (0.032 – 4.988)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.747</td>
<td>0.704</td>
</tr>
</tbody>
</table>

**Discussion**

Globally, vaccine preventable diseases (VPD) contribute significantly towards under-five mortality in spite of availability of many vaccines to prevent them. In order to bring down the under-five mortality, immunization programme need to be successful. Vaccination at correct age is the most important to achieve maximum vaccine-induced protection. DLHS-3 data showed that age-inappropriate vaccination as an important weakness in the national immunization programme. Immunization coverage studies help the programme managers to monitor the gaps in implementation of the immunization programme.

The study findings showed that 180 children (85.7%), were completely immunized. These findings were similar to other studies done among urban poor in Delhi (80.8%) and Mumbai (88.07%). But there are many other studies which have reported very low coverage of complete immunization among children living in urban slums. This indicates that immunisation coverage among urban poor people is not uniform across the country. This calls for more periodic local surveys for identification of gaps in the implementation of immunization programme.

The uptake of immunization among residents of urban slums depends on many factors. In this study, the boy to girl complete immunisation coverage ratio was found to be 1.249 which is consistent to findings in a study done in Tamil Nadu but different from the findings in a study done in Delhi. Completion of the childhood immunisation schedule was higher among Hindu households compared to non-Hindu households and this finding is concordant with other previous studies. Religious belief had shown to influence immunization in low-income and middle-income countries.

In our study, children from joint families and family with more members were found to have more complete immunisation. This phenomenon was not reported in any previous studies. One reason could be more people available to take the child for immunisation. Mother’s education was strongly associated with complete immunisation. Those mothers’s with higher education status tends to give their children complete vaccination. This is consistent with other studies done in the past. Mother’s occupation also affected the immunisation status though in a different way. Mother’s who stay at home is more likely to complete their child’s immunisation in comparison to mother who go out to
work.

There is a complete heterogeneity as far as immunisation coverage is concerned among the poor in urban areas.

Limitation

In some children (18%) the vaccination card was not available. The entire questionnaire was filled from mother’s recall which may not be very accurate. Secondly, we only focused on the receiver side factors without collecting any data relating to supplier’s side limitations like supply of vaccine or regularity of outreach session and other issues related to infrastructure and man power.

Conclusion

Our study estimated the proportion of completely immunized children among residents of urban slum in a city. Various socio-demographic factors influencing vaccination among children were explored. Findings from this and similar studies will help the immunisation programme managers to bring about changes in the system to achieve full immunisation coverage among these disadvantaged groups.

Conflict of Interest: No conflict of interest

Source of Funding: Self

Ethical Clearance: From the Institutional Human Ethics Committee, Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh.

References


Customer Satisfaction on Health Insurance in India – A Study

A. Meenakshi¹, S. Vennilaa Shree²

¹Assistant Professor, Department of Commerce, VELS Institute of Science, Technology & Advanced Studies (VISTAS), Pallavaram, Chennai, ²VELS Institute of Science, Technology & Advanced Studies (VISTAS), Pallavaram, Chennai

Abstract

Good Health confer on a person or groups’ freedom from illness - and the ability to realize one’s potential. Health is therefore best understood as the essential basis for defining a person’s sense of wellbeing. Health insurance is an insurance beside the risk of incurring health expenses among individuals. Health insurance remainder hugely under-developed in India. Only 11% of population is currently covered with Health Insurance. Around 24% of all people hospitalized in India in a single year drop below the poor-quality line due to hospitalization (World Bank, 2002).

An analysis of finance of hospitalization shows that large section of people borrows currency or sells property to pay for hospitalization (World Bank, 2002). Majority of Indians are more susceptible to Major ailment. Marketing of Health insurance policies become principal important to help people to meet out the unpleasant expenses arising out of unexpected ailments. It will be a win-win condition for Public and companies of growing the dissemination of health insurance harvest to its fullest possible.

The benefit of health insurance must be extended to the excluded population too. visibly there is an urgent need to enlarge the health insurance net in India, in such a situation it is essential to understand the consumers how far they are attracted in import health insurance, customers awareness is to be recorded, it is important to limit the out-of-pocket expenses of the consumers, and suggest and bring an awareness to the consumers how health insurance would help in dropping their financial burden during hospitalization.

Keywords: Awareness, Factors, Customer satisfaction, Problems.

Introduction

The strength of any nation is its health. There is experiential data that the health of a people extensively enhances its economic development, and vice versa. India is a second heavily populated country in the world and also a largest democratic state of the world. Since its self-government India has made significant progress in terms of the health indicator and health communications. India’s National Health Policy first formulate in 1983 and revised in 2002 has been to improve the health of the population. Growing demand for modern medical care, brought on by a rapidly, growing population, rising literacy levels, and technological advancement lead to high expectation from the health services. This has shift demand in favor of health care.

History:

The health insurance industry has grown-up considerably mainly due to liberalization of economy and general awareness. According to the World Bank, by 2010 further than 25% of India’s population had access to some form of health insurance. There are standalone health insurers along with government sponsor health insurance provider. pending recently, to improve the alertness and reduce the procrastination for buying health insurance, the General Insurance Corporation of India and the Insurance Regulatory and Development Authority (IRDA) had launch an awareness crusade for all segment of the population.

Health Insurance Schemes

Based on possession, the existing health insurance schemes can be generally separated into categories such as:

Government or state-based systems
Market-based systems (private and voluntary)
Employer-provided insurance

Member organization (NGO or cooperative) based systems

**Review of Literature**

Since 1954, all employees of the central government, some autonomous and semi government organizations, MPS, Judges, freedom fighters and journalists are covered under the central government Health Scheme.

“One another objective of health reform worldwide is to hold healthcare accountable for its resource use and the way healthcare services are delivered. This relates not only to the overall health of individuals and communities but to the quality of the healthcare experience” - (Reinhardt, 1998) (8)

“The providers and facilities in India can be broadly classified by using three dimensions: ownership styles (public, private not-for profit, private for-profit and private informal); systems of medicines (allopathic, homeopathic and traditional); and types of facilities (hospitals, dispensaries and clinics). These dimensions are interdependent and overlapping”. (Bhat,1993) (4).

“These factors include the growth of home incomes, the inadequacy of the public health sector, and the effects of various government policies on the operation of different health care markets” - (Alejandro Herrin, 1997) (7)

“Marketing is an organizational purpose and a set of processes for create, communicating and delivering value to customers and for managing customer relationship in ways that benefits the organization and its stake holders” - (Kotler Philip, 2008) (1)

R. Amsaveni and S. Gomathi (2013) (3) made an attempt to find out Mediclaim policy holder satisfaction, to recognize the reason for preferring Mediclaim policy to safe guard themselves and stay away from future risk, majority of the respondents have taken personal scheme to employees. The major problems faced by the respondents are lack of timely communication and limited list of hospitals covered by the health insurance providers.

**Objectives of the study**

1. To find the awareness level of the respondents towards the health insurance companies and the health insurance policies which was provided by the health Insurers.
2. To find out the factors which influences the respondents in selecting health insurance company and health insurance policies.
3. To analyze the customer’s level of satisfaction towards the services rendered by the health insurance companies and the settlement of claims.
4. To study out the problems faced by the Health Insurance Policy Holders.
5. To provide suggestions based on the results of the study.

**Hypothesis of the Study:**

Null Hypothesis (H₀): The awareness level of the insurance companies is not equally distributed.

Alternate Hypothesis (H₁): The awareness level of the insurance companies is equally distributed.

**Technical Tools applied in the Study:**

The statistical tool applied to perform this study is Chi-Square Analysis.

**Table : Demographic Details of the Respondents**

<table>
<thead>
<tr>
<th>Variables under Study</th>
<th>Domain</th>
<th>No. of Respondents</th>
<th>In %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age group</td>
<td>Below 30</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>30 to 40 years</td>
<td>108</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>40 to 50 years</td>
<td>89</td>
<td>29.67</td>
</tr>
<tr>
<td></td>
<td>Above</td>
<td>64</td>
<td>21.33</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married</td>
<td>269</td>
<td>89.67</td>
</tr>
<tr>
<td></td>
<td>Unmarried</td>
<td>31</td>
<td>10.33</td>
</tr>
<tr>
<td>Educational Qualification</td>
<td>Schooling</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Diploma/ Degree</td>
<td>84</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Post-graduate</td>
<td>74</td>
<td>24.67</td>
</tr>
<tr>
<td></td>
<td>Professional Degree</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Uneducated</td>
<td>33</td>
<td>11</td>
</tr>
<tr>
<td>Occupation</td>
<td>Government sector</td>
<td>38</td>
<td>12.67</td>
</tr>
<tr>
<td></td>
<td>Private Sector</td>
<td>97</td>
<td>32.33</td>
</tr>
<tr>
<td></td>
<td>Business people</td>
<td>104</td>
<td>34.67</td>
</tr>
<tr>
<td></td>
<td>Professionals</td>
<td>32</td>
<td>10.67</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>29</td>
<td>9.66</td>
</tr>
</tbody>
</table>
Calculation of Chi-Square analysis

**Interpretation:**

H 0 – There is no significant difference exist between the age group of respondents with regard to the Responses towards the health insurance is a mist for all individuals

H 1 – There is significant difference exist between the Age group of the respondents with regard to the response towards the health insurance is a must for all individuals.

The Calculated value of X² is compared with the table value of X² for given degrees of freedom at specified level of significance. If the calculated value of X² is greater than the table value, the difference between and observation is considered to be significant. i.e., it could not have arisen due fluctuations of simple sampling on the other hand if the calculated value of X² is less than the table value the difference assumption and observation is not measured significant, i.e., it could have arisen due to fluctuations of sampling.

**Conclusion**

This study enabled the researcher to understand the nuances about the Health Insurance who should take what are the advantages of the same. This study basically showed that the majority of the respondents who visited private hospitals have health Insurance, which might prove beneficial in the long run. This is very useful in identifying the factors and reasons that are important for individuals taking up and Health Insurance.

**Ethical Clearance:** Exempted. Research involving information freely available in the public domain

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**

2. Agarwala Amar Narain, “Health insurance in India”, East End Publishers, University of California, 13 Dec 2007,
Transcranial Direct Current Stimulation in Combination with TENS: Effectiveness on Pain and Functional Outcomes in Knee OA Patients – A Study Protocol

Rekha Chaturvedi, Sivachidambaram Kulandaivelan, Manoj Malik, Shabnam Joshi

1 Assistant Professor; Guru Jambheshwar University of Science and Technology Hisar, Haryana

Abstract

The goal of the study is to investigate the effectiveness of combination of Transcranial direct current stimulation (tDCS) and TENS on pain and functional outcomes in patients with knee osteoarthritis. Patients following ACR criteria for knee osteoarthritis, aged more than 45 years will be selected for the study. 80 patients will be selected and will be randomized into following four groups: Active tDCS/active TENS (group 1), Sham tDCS/active TENS (group 2), Active tDCS/sham TENS (group 3), Sham tDCS/sham TENS (group 4). The study will be participant blinded randomized controlled trial. The outcome variables are pain and functional assessment using six minute walk test and self-reported questionnaire KOOS.

Trial Registration: CTRI/2018/02/012027.

Keywords: Combination, Transcranial direct current stimulation, TENS, Pain, Osteoarthritis, Knee.

Background

Knee osteoarthritis (OA) is one of the common cause of musculoskeletal pain and disability. It is estimated that 20% of people aged over 30 years experience knee symptoms in India,1 resulting in substantial pain and physical dysfunction.2 Various therapeutic exercises are recommended for patients of knee osteoarthritis with the prime aim of improving muscular strength, as weakness is common in knee OA. Strength training can conquer the muscle weakness in such patients by improving the muscle mass. However, pain becomes a hurdle in exercising that causes individuals to underperform the exercises. Therefore, strengthening the musculature of lower limb can overcome this problem. Many pharmacologic treatments are available however; there is growing interest in non-pharmacologic intervention targeting the central nervous pain processing system.

Transcranial direct current stimulation (tDCS) is used in chronic pain conditions because of its neuromodulatory effect3-6. The application of TENS in knee OA has been demonstrated to be effective in managing arthritic pain7-12. Thus, by combining the two interventions can generate both the neuromodulatory effect (cortical effect) as well as segmental inhibition in the pain gate13and descending pain suppression via d-opioid mechanisms (spinal and peripheral effect). Various studies have suggested tDCS combined with TENS resulted in greater pain reduction than their isolated application in low-back pain (LBP) by the priming effect14, 15. Therefore, taking in account of these encouraging results, we hypothesize that the combined application of tDCS, TENS and exercise will reduce pain to greater extent and may enhance mechanistic and clinical outcomes in knee OA. Moreover, RCTs from Asian countries, particularly India where knee pain is common1, is still lacking and our protocol is aimed to reduce this knowledge gap.

Objectives:

The primary objective of the study is to find out the effectiveness of combined tDCS and TENS on pain. The secondary objective of the study is to find out the effectiveness this combination on quality of life in patients with knee osteoarthritis.

Hypothesis:

Transcranial stimulation (tDCS) in combination with TENS will reduce pain and bolster the effect of exercise by priming effect thereby improving function.
in knee osteoarthritis patients and may regulate pain by the “top down and bottom up” mechanism.

**Method**

**Target population and sample:**

The subjects will be recruited from public announcements, flyers and referral cases of knee OA from various hospitals. The study will be conducted at 3 centers in XXX. The participants fulfilling the American college of Rheumatology (ACR) criteria for clinical classification for idiopathic knee OA will be recruited for the study.

The sample size was calculated by pilot study on 8 subjects with 80% power at 95% confidence interval of effect size 0.54. Sample size of 16 subjects in each group was calculated. The sample size was increased to 20 subjects expecting 20% dropout rate.

**Inclusion criteria:**

The subjects will be selected on the basis of criteria defined by the ACR Criteria: Presence of knee pain and any three of following: age over 45 years; morning stiffness lasting less than 30 min; crepitus; bony tenderness; bony enlargement; no palpable warmth.

**Exclusion criteria:**

The subjects will be excluded if they have the following: Any knee surgery in the past 6 months; Knee joint replacement or high tibial osteotomy on the affected side; other muscular, joint or neurological conditions affecting the functions of lower limb; unable to walk unaided; currently undertaking any exercise programme for knee OA; contraindications to tDCS (eg, epilepsy).

**Discontinuity criteria:**

The subjects will be discontinued if: They miss 3 consecutive session of exercise even after repeated reminders made through phone call; any moderate to severe adverse events are presented by the subjects that are related to application of therapeutic intervention or exercises; subjects who involves in other medical treatment for knee OA that may interfere with the results; any other health program like weight reduction or aerobic exercises or Pilates or any other fitness training program.

**Research group and study design:**

**Study design:**

Present study is 4-arm parallel group, participant blinded; sham (placebo) controlled randomized trial. After taking the informed consent at the baseline visit the subjects will be assessed by the researcher thoroughly at the baseline visit and will be randomly allocated to one of the four groups by corresponding author through lottery method done by independent person not participating in the study. All the subjects will receive hot packs followed by the interventions and exercise protocol thrice weekly. All the participants will be assessed four times a) at the baseline visit b) week 1(after 5 days of intervention) c) end of 2nd week d) end of 6th week. All the subjects will undergo weekly thrice supervised exercise training for 5 weeks and advised to do exercises taught at home on the days not coming for the treatment. Home exercises and supervised exercise will be taught by experienced physiotherapist (First author). The study participants were allowed to continue their medications if any, throughout their participation in the trial. At the baseline visit, type of medication, dosage and frequency of medication will be recorded. Total duration of study is 6-weeks including 1st week 5 treatment sessions followed by weekly thrice supervised exercise for 5 weeks.

**Research group:**

The study participants selected following the inclusion and exclusion criteria for the study will be randomly assigned to one of the four groups.

Group 1: Active tDCS /Active TENS (n=20)

Group 2: Active tDCS /Sham TENS (n=20)

Group 3: Sham tDCS /Active TENS (n=20)

Group 4: Sham tDCS /Sham TENS (n=20)

**Intervention description:**

**Transcranial direct current stimulation (tDCS):**

A constant current of 2 mA for 20 min once a day for 5 consecutive days will be by a pair of circular sponge electrode saturated with normal saline. The anode will be placed on primary motor cortex (M1, C3 or C4) as per 10/20 International electroencephalogram EEG system) contralateral to the most painful knee and the cathode will be placed on opposite supraorbital region ipsilateral to the affected knee. For sham stimulation same electrode...
placement will be used. The equipment will be turned on for 30 sec, and then turned off. A Customized model, Medicaid, Chandigarh (Mohali), India will be used for transcranial stimulation.

**Transcutaneous electrical nerve stimulation (TENS):** A pair of surface electrodes 5cm × 5 cm, placed on the skin at medial and lateral side of the knee joint fastened by velcro will be used. High frequency TENS at 100 Hz for 20 min duration will be given to the patient for five consecutive days. Only the most painful side will be stimulated. For sham stimulation the same placement of electrode will be used, with stimulator turned on for 30 sec and then turned off. TENS Enraf Nonius, USA will be used for stimulation. Both the stimulators (tDCS and TENS) will be turned on and off simultaneously during each session of treatment.

**Exercises:** The subjects will perform a supervised exercise protocol following the interventions. Each exercise will be done for 3 sets of 10 repetitions with a break of 30 sec in between the sets. The exercise program will progress as mentioned in the prescribed protocol. The study physiotherapist will decide the initial level of exercise depending upon the ability of the subject and the time when to progress the exercise based on the participant’s performance and therapist’s clinical judgment. The subjects will undergo initial 5 sessions of exercise on 5 consecutive days post intervention (1st week). Subjects will undergo thrice a week supervised exercise sessions for next 5 weeks (2nd-6th week) by study therapist. The participants will also be taught home exercises to be performed on days not coming for treatment. The subjects must undergo at least 12 sessions (including 1st week 5 sessions) of supervised exercise session for estimating the desired benefits of the exercise regime.

**Outcomes:** The outcome variables of all the participants will be assessed four times: at the baseline visit, week 1 (post intervention), 2 week and at week 6.

**Pain:** The intensity of pain will be measured by VAS (0-10 cm) by asking pain on walking during previous day, self-assessed pain describing ‘no pain’ (score 0) and ‘extreme pain’ (score 10) will be reported.

**Function:** Six minute walk test is reliable tool in Indian population will be used for functional assessment. Subject was asked to walk on a 20-m corridor for six continuous minutes as per Ateef et al 2016. The distance covered in meter by the participant will be recorded in the assessment form.

**Quality of Life:** It will be assessed through self-reported Knee injury and Osteoarthritis Outcome Score (KOOS) questionnaire containing 42 questions in five subscales namely pain, symptoms, activities of daily living (ADL), sports/recreation and quality of life. Score ranges from 0 to 100 where 100 means maximum problem. KOOS is a reliable assessment tool in Indian knee OA patients.

**Safety:**

For ensuring safety of the participants questions like any symptoms of itching or burning sensation, tingling, any kind of pain at the stimulation site, headache, mood changes, anxiety, nervousness, or any kind of changes in visual perception during or after the treatment or any other potential risk described by Rossi et al 2009 will be asked.

**Ethical aspects:**

The trial will be conducted according to the ICMR (Indian council of medical research) 2017 guidelines which are in accordance with Helsinki declaration 2013 (7th revision). All the participants will sign the informed consent prior to participation in the study.

The trial has been prospectively registered with the Clinical Trail Registry of India number CTRI/2018/02/012027 registered on 21/02/2018. Ethical approval was obtained from Institutional ethical committee vide letter no. PTY/2017/484 dated 9th October 2017. The findings of the study will be shared with the participants in simple language. Confidentiality of the participants will not be breeched at any point of the study. The raw original data will be archived for 5 years by the investigator of the study. Consolidated data without participant’s personal details will be permanently archived in Mendeley data repository.

**Consent to publish:**

A written permission from the participant will be obtained for the data and images to be published.

**Data analysis:**

The data will be analyzed as per principle of intention to treat. To find out the effectiveness of interventions, analysis of pain and functional outcomes
per protocol analysis of variance (ANOVA) will be used. Repeated measure ANOVA will be used to estimate the effectiveness of interventions within the group for all the four groups. Effect size will be calculated.

**Discussion**

The paper is in accordance with the recommendations of SPIRIT guidelines (Standard Protocol: Recommendations for Interventional Testing) in evolution and recording of protocol for the study. Considering OA as a debilitating health problem, requires better management of pain and function thus making the population less disabled. Supervised exercise program shows better results as the treatment is given on one to one basis. In a study on knee osteoarthritis the application of tDCS demonstrates substantial pain reduction and improved mobility performance and the effect of stimulation lasts for 3 weeks. In another study tDCS combined with TENS demonstrates promising results in chronic LBP patients. Present protocol is similar to Luz-Santos et al. and marginally different from it by outcome measures. We believe 6-minute walk test is more functional hence meaningful to patients; would help the therapists to monitor rehabilitation outcome. Considering the results obtained from these studies the effectiveness of tDCS used alone as well as in combination with TENS must be explored for treating musculoskeletal conditions like knee OA. tDCS, either alone or combination, may be a potential intervention for better management of pain and functional activities in knee OA.

**Benefits:**

The subjects will be asked to continue the exercises even after the completion of trial at home to sustain the benefits of exercises. The results of the study if comes out to be effective, the leading treatment will be offered to the people not received the treatment.

**Trial status:**

The study is enrolling participants from April 2018 onwards and estimated to be completed by March 2020.

**Compliance with Ethical Standards:** This article does not contain any studies with human participants performed by any of the authors.

**Funding:** There is no external funding to write this paper.

**Conflict of Interest:** The author of the study declares no conflict of interest.

**References**


An Empirical Study on the Impact of Emotional Intelligence on Occupational Performance

Mekhala. R.S¹, Sandhya K¹
¹Assistant Professor, Department of Business Administration, Vels University, Chennai

Abstract
The main aim of this article is to prove that, developing emotional intelligence have a positive effect in occupational performance. The measurement of emotional intelligence and its best application is proved here to maximize occupational productivity. This paper is composed explicitly for HR experts with the goal that they will be better educated and, hence feel increasingly certain about affecting key partners in the usage of EI projects, procedures and mediations.

Objective: EI dimensions have a positive focus on the emotions and have a stronger positive association with Occupational performance.

Findings and suggestions: EI shows a positive correlation with occupational performance and in-turn increases the productivity. If emotional intelligence is developed through proper training, the Occupational productivity can be increased to desired level according to the ability of the employees.

Keywords: Emotional Intelligence, Occupational Performance, HR experts, Training, EI projects

Introduction
Emotional intelligence (EI) seems to be the most uttered word since the publication of the book “Emotional Intelligence by Daniel Goleman¹⁰. Even though the concept of Emotional Intelligence is an old concept, which draws attention in the recent times, its application is designed to increase individual performance and organizational productivity,

The work of David McClelland from Harvard University which pointed out the relevance of emotionally and socially intelligent behavior among managers. The historical roots of emotional intelligence can be traced the studies of Darwin⁵. Many of the recent articles spot out the importance and relevance of this concept of Emotional Intelligence among the work place

This paper creates a scientific and practical pavement between the variables Emotional Intelligence and Occupational productivity and performance. It provides empirical evidence of the bottom-line impact of EI interventions. Based on Gardners⁹ work explains the measure and define the concept of Emotional Intelligence. Salovey and Mayer’s¹⁵ research gave Bar-on’s idea of Emotional Intelligence that opened the door of scientific outcomes on the concept of Emotional Intelligence. Goleman¹⁰ published the book that explains the above mentioned concepts in a wider range and became one of the best seller. The best way to define, measure and apply emotional intelligence seems still as a million dollar question which is not yet solved.

Bharwaney³, analysed that the above three instruments of emotional intelligence and critiqued, the author compares the other available Emotional Intelligence instruments also. The valid instrument should fulfill the representative sample of the local population and compare with demographic variables like age, gender, socio-economic factors and factorial, construct and predictive vailidity. The scales of these three EI measures are listed in Table 1 to provide the

Corresponding Author:
Dr. Mekhala. R.S,
Assistant Professor, Department of Business Administration, Vels University, Chennai.
Email – mekhala.sms@velsuniv.ac.in, +91 9677031989
reader with a quick overview of the various aspects of emotional intelligence that are being measured with these instruments.

The three most popular measures of emotional intelligence, designed to assess this construct by Emotional Quotient scale, ECI scale and MSCEIT are follows.

<table>
<thead>
<tr>
<th>EQ</th>
<th>ECI</th>
<th>MSCEIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrapersonal</td>
<td>Self awareness</td>
<td>Perceiving emotions</td>
</tr>
<tr>
<td>Self Regards</td>
<td>Emotional Self awareness</td>
<td>Faces</td>
</tr>
<tr>
<td>Assertiveness</td>
<td>Acurate Self Assessment</td>
<td>Pictures</td>
</tr>
<tr>
<td>Independence</td>
<td>Self Confidence</td>
<td>Facilitating Emotions</td>
</tr>
<tr>
<td>Self Actualization</td>
<td>Self Management</td>
<td>Facilitations</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Emotional Self Control</td>
<td>Sensations</td>
</tr>
<tr>
<td>Empathy</td>
<td>Transparency</td>
<td>Understanding Emotions</td>
</tr>
<tr>
<td>Social Responsibility</td>
<td>Adaptability</td>
<td>Changes</td>
</tr>
<tr>
<td>Interpersonal Relation</td>
<td>Achievement Orientation</td>
<td>Blends</td>
</tr>
<tr>
<td>Stress Management</td>
<td>Initiative Optimism</td>
<td>Managing Emotions</td>
</tr>
<tr>
<td>Stress Tolerance</td>
<td>Social Awareness</td>
<td>Emotion Management</td>
</tr>
<tr>
<td>Impulse Control</td>
<td>Empathy</td>
<td>Emotional Relationship</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Organizational Awareness</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>Service Orientation</td>
<td></td>
</tr>
<tr>
<td>Reality testing</td>
<td>Relationship Management</td>
<td></td>
</tr>
<tr>
<td>Problem solving</td>
<td>Developing Others</td>
<td></td>
</tr>
<tr>
<td>General Mood</td>
<td>Inspirational Leadership</td>
<td></td>
</tr>
<tr>
<td>Optimism</td>
<td>Change Catalyst</td>
<td></td>
</tr>
<tr>
<td>Happiness</td>
<td>Influence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conflict Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team work and Collaboration</td>
<td></td>
</tr>
</tbody>
</table>


**Objective of the Study:**

EI dimensions have a positive focus on the emotions and have stronger positive associations with Occupational performance.

**Measurement Instruments:**

1. Salovey and Mayer’s Bar-on’s idea of Emotional Intelligence


**Research Design**

Descriptive research design was followed in this research. Obviously, this aims at finding out relationship among variables. The impact of work place bullying on selected demographic, psychological, and situational
and outcome variables are studied in detail.

**Method Of Administration**

A sum of 391 respondents was met individually in their working place or their leisure time, with a request to fill in the questionnaire. They were informed to feel free and give their unbiased, genuine and realistic responses. They were also assured that their responses would be kept in strict confidence and would be used exclusively for research purposes. The researcher has distributed 391 questionnaires among the employees, out of which 365 employees have returned the filled questionnaire, after scrutiny a total of 340 questionnaires were selected from the employees of different departments. Thus the data collection process was completed. The collected responses from the various department employees were scored as per the procedure and were tabulated. Then they were subjected to suitable statistical treatment.

**Analysis And Interpretation**

First stage of analysis concentrates on self and other focused dimensions of Emotional Intelligence and Occupational Productivity. The second part of analysis concentrates on self and other focused dimensions of Emotional Intelligence which is explained in Salovey & Mayer study. The third part analyses the people’s ability to display emotional intelligence ability in a given situation. Elfenbein suggests that the ability that is depicted by people on every situation not only depend on their EI ability but it also on the group stability, motivation, demands for that particular time.

**Table 1: Showing ANOVA explaining the link between the three dimensions of Emotional Intelligence and Occupational Performance**

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1056.967</td>
<td>3</td>
<td>352.322</td>
<td>1626.529</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>72.781</td>
<td>336</td>
<td>.217</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1129.748</td>
<td>339</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), COMPETENCY, SENSITIVITY, MATURITY

b. Dependent Variable: Occupational performance

From Table 1, it is clearly shown there is a significant difference between the dimensions of EI (Competency, Sensitivity, Maturity) and Occupational Performance has a positive relationship. Thus studying the dimensions of emotional intelligence is allowed to test the fluctuations in job performance. Moreover the approach examines the link closer the Emotional intelligence – performance link in job and contributes the extrapolated way of understanding EI in existing work. Zeidner et al. studies proves the same way of explaining EI dimensions and its link towards Occupational Performance

**Table 2: Showing ANOVA Explaining the link between the three dimensions of Emotional Intelligence and Occupational Performance**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std. Error</td>
<td>Beta</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>(Constant)</td>
<td>8.418</td>
<td>.066</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SENSITIVITY</td>
<td>-.420</td>
<td>.077</td>
<td>-.244</td>
<td>.779</td>
</tr>
<tr>
<td>MATURITY</td>
<td>.204</td>
<td>.099</td>
<td>.116</td>
<td>.536</td>
</tr>
<tr>
<td>COMPETENCY</td>
<td>-1.253</td>
<td>.040</td>
<td>-.877</td>
<td>.467</td>
</tr>
</tbody>
</table>

. Dependent Variable: Occupational performance
Table 2 explains the how the dimensions of EI (Competency, Sensitivity, Maturity) and Occupational Performance shows distinct relationship with occupational performance respectively. Sensitivity shows significant difference with Occupational performance, which means the ability to sense and manage one’s own emotions is related and managed to occupational performance. The second part, ie, Maturity, the ability to understand other’s emotions and Occupational performance is significantly different (p=.05). So this ability can be regulated and has a relationship with Occupational performance. The third and the main part of the study is the factor of competency, ie, the ability to regulate and manage our own emotions and others emotions according to the situation has a positive and significant relationship with Occupational performance.

These streams of studies reflect and overlap between the cognitive abilities and the nature of EI. Especially the ability of EI varies with personalities and mainly co-varies with a person’s cognitive ability. O’Boyle et.al \(^{17}\) explains in his study that EI can be best measured with ability tests and self reported questionnaires.

This Figure \(\#1\) explains the relative relationship between the concepts of EI and the Occupational performance.

From the above histogram its clear that mean value constant is 9.65 and standard deviation is .996 which is positive and above 90%, which shows a higher correlation with Occupational performance. Petrides \(^{18}\), explains in his study relating job performance and meta analytic data showing the positive correlations between the trait EI and job performance. In his study the self reported measures sowed more incremental validity in predicting job performance over Cognitive abilities.
Table 3: Explaining the residual statistics between the dimensions of EI and occupational performance.

<table>
<thead>
<tr>
<th>Residual Statistics</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predicted Value</td>
<td>1.2877</td>
<td>6.9491</td>
<td>5.2233</td>
<td>1.76576</td>
<td>340</td>
</tr>
<tr>
<td>Std. Predicted Value</td>
<td>-2.229</td>
<td>.977</td>
<td>.000</td>
<td>.00000</td>
<td>340</td>
</tr>
<tr>
<td>Standard Error of Predicted Value</td>
<td>.032</td>
<td>.078</td>
<td>.049</td>
<td>.012</td>
<td>340</td>
</tr>
<tr>
<td>Adjusted Predicted Value</td>
<td>1.2798</td>
<td>6.9486</td>
<td>5.2225</td>
<td>1.76689</td>
<td>340</td>
</tr>
<tr>
<td>Residual</td>
<td>-9.4360</td>
<td>1.13656</td>
<td>.0000</td>
<td>.46335</td>
<td>340</td>
</tr>
<tr>
<td>Std. Residual</td>
<td>-2.027</td>
<td>2.442</td>
<td>.000</td>
<td>.996</td>
<td>340</td>
</tr>
<tr>
<td>Stud. Residual</td>
<td>-2.032</td>
<td>2.453</td>
<td>.001</td>
<td>.999</td>
<td>340</td>
</tr>
<tr>
<td>Deleted Residual</td>
<td>-9.4796</td>
<td>1.14690</td>
<td>.00082</td>
<td>.46699</td>
<td>340</td>
</tr>
<tr>
<td>Stud. Deleted Residual</td>
<td>-2.042</td>
<td>2.472</td>
<td>.000</td>
<td>1.003</td>
<td>340</td>
</tr>
<tr>
<td>Mahal. Distance</td>
<td>.564</td>
<td>8.518</td>
<td>2.991</td>
<td>2.036</td>
<td>340</td>
</tr>
<tr>
<td>Cook’s Distance</td>
<td>.000</td>
<td>.014</td>
<td>.002</td>
<td>.003</td>
<td>340</td>
</tr>
<tr>
<td>Centered Leverage Value</td>
<td>.002</td>
<td>.025</td>
<td>.009</td>
<td>.006</td>
<td>340</td>
</tr>
</tbody>
</table>

Dependent Variable: Occupational performance

Explaining the residual statistics in relation to job performance, meta-analytic data showed that ability EI tests display the correlation (r = .977), followed by self-reported trait EI measures (r = 1.766) and self-reported EI measures (r = .049). O’Boyle et al., (2011) suggested that self-reported EI measures showed more incremental validity in predicting job performance. In the present study, EI is conceptualized based on the Four-Branch Model (Mayer & Salovey, 1997). Besides it is showing a stronger correlation with Occupational performance.

The above mentioned analyses with Emotional Intelligence have found a high association with occupational performance. These analyses also reveal that the factor emotional intelligence act as one of the moderators with Occupational performance. Joseph & Newman12 suggest that Emotional Intelligence has a stronger relationship with sales and counseling jobs, which includes high level of interpersonal contact. Davies, Stankov & Robert’s18 in their study focused on the Emotional intelligence conceptualization, which inturn gives a composite of emotional perception and understanding. For instance, if a sales person is attending a short tempered customer, the focus need to be maintained on the customer's emotion at the same time remaining calm. Wong & Law21 empirically distinguished the components that differ in emotional dimensions from people to people.

Normal P-P Plot of Regression Standardized Residual

Figure no: 2 The relative relationship between the dimensions of EI and occupational performance.
The dimensions of emotional intelligence can contribute to Occupational performance. Especially when it is related to occupational performance, it involves various other people to get indulge. For instance, if one wants to mediate a conflict or sell a product only by focusing on their own emotions in order to influence their own mood state. Even the most well known instruments for emotional intelligence does not distinguish between traits that belong to self and others. Mayer & Salovey\textsuperscript{14} scores mainly focus on emotions of others. Petrides\textsuperscript{18} developed The Trait Emotional Intelligence Questionnaire combines the emotions of the self and the ones which is shown by others. Wisker & Poulis\textsuperscript{20} study says that all the four dimensions of emotional intelligence indeed contribute to the job performance among sales persons. Law et. al\textsuperscript{8} research proved the same concept among laboratory assistants. X. Liu, Zhang, & Liu\textsuperscript{13} a recent research shows that employee satisfaction is positively related to leaders emotion.

**General Discussion**

This article highlights the importance of the trait emotional intelligence among the employees in jobs, where they have to integrate with many more other kinds of people. The lack of emotional intelligence is the reason behind the cases handled by divorce lawyers and the problems faced by sales executives. Wong & Law\textsuperscript{21}, Brasseur et al.,\textsuperscript{4} and Liu et al.,\textsuperscript{13} stated in their studies that the Emotional Intelligence dimensions which is described as sensitivity (knowledge about self), maturity (knowledge about others) and competency (knowledge about group) helps in productive performance in job.

Joseph & Newman\textsuperscript{12} analyzed that beneficial effects of Emotional Intelligence in job performance which includes interpersonal relationships. Thus this research contributes to the literature by proving that a difference between self- and other-focused EI is relevant for the prediction of job performance. Another effective outcome of this study is the examination of the effects of combined EI dimensions. Elfenbein\textsuperscript{7} proved that there are very few studies that have actually tested how and whether these dimensions may interact, even though most studies prove that EI is constituted with various components.

**Conclusions**

Thus the simultaneous implementation of Emotional dimensions is been changed with their different effects. This concept must be further explored. This research article contributes to a different dimension for the enactment of the concept of EI. As the findings suggest that there is a positive and influential implication of emotional intelligence in Occupational performance. This proves to be an added eye opener in the list of various similar researches which is been followed. This suggests that the enactment of the dimensions of various situations and validity measured for different variables is specially designed to prove the same.

**Limitations And Implications**

The present study has got certain limitations. First of all the emotional intelligence scale which is used to measure the variable, describes various other variables also, which has a low impact on our study. Since its well validated scale and its been followed as a protocol in various other related studies, the same scale has been used in this research. EI is a socially accepted character, our respondents might have responded more positively and unbiased. The examination of different combination of EI dimensions might have given birth to a new way of outcome in the present research.

Research on emotion contagion has proved to have too much attention to negative emotions of other people that might have negative consequences for employees themselves Bakker, Schaufeli, Sixma, & Bosveld,\textsuperscript{2}. Related to this point, there is an ongoing debate on the “curse of emotion” Antonakis, Ashkanasy, & Dasborough,\textsuperscript{1}; Jordan et al.,\textsuperscript{11} a phenomenon in which leaders’ sensitivity to their followers’ emotions hinders them to provide corrective feedback or to take disciplinary action when necessary. This point proves that dimensions which are focusing on other factors like job performance and employee well being. In this way employees can be well encouraged to focus on EI dimensions more during their work. To raise awareness of the direct effects of the appraisal of others’ emotions, companies could implement specialized training programs in which both self- and other-focused EI are trained e.g., Clarke,\textsuperscript{4}. The self and others to whom EI dimensions are directed seems important for the forecasting of job performance and might impact the prediction of other dimensions. Finally, the examination of the effects of combined EI dimensions on Occupational performance may correspond better to the dynamics of emotional processes. It is our hope that these new approaches may
move the field toward a better understanding of EI.

**Ethical Clearance** - Na

**Source of Funding** - Self

**Conflict of Interest** - Nil

**References**

Measure to Human Ailments – A Holystic Approach

S N Sugumar¹, M P Agathiyar², S Chandrachud³

¹Prof. and H.O.D of Economics, Vels University, Chennai, ²Agasthiyar Clinic, Vadapalani, Chennai, ³Associate Professor, VISTAS, Chennai

Abstract

The modus operandi of the health article is to understand the pros and cons of the human ailments through approaches in allopathy, acupuncture and yoga. The role of health economist and his responsibilities are analyzed both theoretically and empirically in order to attain the recovery of human ailment in natural way. The current study comprises of six chapters. Chapter one briefs the basics of health economics. Chapter two enlists the review of literature. Chapter two envisages the significance of health. Chapter three analyzes the economics of health. The chapter four is continued causes for human ailments. Chapter five enlists the treatment through allopathy, acupuncture and Yoga. The last chapter concludes with suggestion for health economics.

Keywords: Health, Allopathy, Acupuncture, Yoga, Human ailments

Introduction

Health economics deals with the efficiency effectiveness, value and behavior in the production and consumption of health care products and services. Health economists to do the research on the function of health care system, the demand for and the supply of health care products and services and health affecting behaviors such as consuming alcohol, smoking, food habits, life style and the attitude of an individual and the society. Economists in short, analyze the economics of causes and the consequences of human ailments i.e. the cost - benefit analysis of healthy human beings. The current study throws light on the comparative analysis of three different medical approaches for human ailments such as treatment of allopathy, Yoga solution for human ailments and Acupuncture points for human ailment and exposes the thrust area on health economics.

Review of literature

Justin C. Fay¹ In this study, the author has concluded that the recent progress in understanding how adaptive evolution during human history has incurred some cost to the health of modern humans. The examples used have various levels of support for the association between human adaptation and disease. More importantly, they illustrate the variety of mechanisms and types of supporting evidence used to connect current human health with our evolutionary past. Finally, it is important to recognize that only a subset of human diseases has been influenced by our adaptive history. In this regard, understanding the molecular basis of adaptation may provide insight into certain disease mechanisms.

Lu Liang and Peng Gong² In their research article they mentioned that a wide range of disease and climatic terms is not beneficial to synthesis efforts considering the potential statistical bias caused by insufficient cases for a certain disease or climate type, and the difficulties in result interpretation. The broad categories in the database should thus be merged into several concise classes based on their similar functional characteristics.

V. Ramana Dhara, Paul J. Schramm, and George Luber³ According to them, as India’s economy continues to expand, the growing middle class presents a unique situation. While rising out of poverty will improve sanitation levels and living conditions, thus increasing resilience to infectious diseases, it will also lead to higher consumption patterns that can initiate new health problems while leading to more carbon pollution.

Anteneh Belayneh and Negussie F Bussa⁴ They concluded that the binomial test on the depth of ethnomedicinal knowledge between younger and elderly informants showed a significant difference. Many young people were less knowledgeable about the variety and
value of traditional medicinal plants. This showed the level of deterioration of ethnomedicinal knowledge in this prehistoric study area. It is, therefore, necessary to preserve this indigenous knowledge on traditional medicines by proper documentation, identification of plant species, herbal preparation and dosage. In addition, it should be followed with phytochemical and pharmacological analyses in order to give scientific ground to the ethnomedicinal knowledge. Similar type of research has been conducted in the other side of the globe like, Ketema Tolossaa et al\(5\), (2013) and Getnet Chekole,\(6\) (2017) etc.

**Significance of health**

Health is important for any living being whether it is mankind or animal kingdom. Healthy life makes human life more meaningful and productive. The state of health conditions facilitate the people to carry out their efforts and duties smoothly. Physical fitness is indispensible to offset our economic and social obligations. In all our belongings health comes first and health is our first wealth. That is why we ask “how are you” while we meet others.

Accumulation and maintenance of normal health is more important than the accumulation of material wealth because healthy life leads to wealthy life. Like other goods and services health products and services, health education, health awareness play a major role in human development which inturn facilitate social and economic development of a country. Mental and physical fitness jointly explain the overall health condition of an individual. Strong body and strong mind of human being determine the overall productivity of an economy.

**Economics of Human health**

Human health is part and parcel of human development. Expansion of knowledge and perfect health conditions determine the quality of human capital. Investment in people, especially health and education improves the quality of human capital which in turn determine the level of economic development of a country. In fact, inventions, innovations, technological progress and development are the major determinants of economic developments but they are the direct outcome of human capital. The rapid growth and development of an economy depends upon the quality and quantity of human capital, therefore, the health dimensions of human capital is more significant in an economy.

The major economic issues pertaining to human health are employment and income generations. Better the health conditions of the people the greater the level of employment and income generations. Poor human health is indicated by huge medical expenditure, loss of man hours, loss of production, loss of income, loss of happiness, loss of social interactions, feeling dull and fatigue, tiredness and demotivations, indebtedness etc… Therefore, this paper made an attempt to discuss the causes of human ailments and the solutions for the same through the alternative medicines.

**Causes of human ailments**

As per the concepts of alternative medicines, especially homeopathy medicines all human ailments are caused by our thoughts, actions and suppression of thoughts. According to siddha and Ayurveda the imbalance among vatta, pitta and kapha and ultimately the imbalance is caused by human thoughts and actions. Our thoughts make us happy or unhappy, rich or poor, active or dull etc., As per the law of nature everything is mind and everything came out from our own mind. The whole world is a projection made by our own mind. We see outside what we write inside in our mind. Therefore, mind makes a man healthy or unhealthy. As we think so we live. Mind is nothing but the bundle of thoughts.

Thoughts are nothing but the feelings arise in our mind. It is the feeling that is the life. It is the feeling which determines the status of our health. The feeling of love produces love. The feeling of happiness produces happiness. Thus, the human feelings cause human ailments. As per the alternative medicines, especially, acupressure and acupuncture the feeling of fear damages kidney, the feeling of angry damages liver, the feeling of worries and frustration damages stomach, excess joy and anxiety damages heart and lungs. etc.

Our actions especially excess standing damages urinary bladder and kidney (solution rubbing our back for one minute), excess sitting damages stomach and spleen can also cause anemia and digestive disorder (stimulate st.36), excess lying down damages large intestine and lung and there by affects respiration (stimulate Li 4 & Li 11), excess use of eyes and emotional stress damages small intestine and heart (stimulate CV 17), excess physical exertion damages gall bladder and liver which results in cramp (stimulate LV 3).
Allopathy and Indian medicines

Health, in general, is the outcome of combination of many forces such as intrinsic and extrinsic and collective, private and public medical environment and it is ultimately conditioned by socio-economic and cultural aspects of the society. There is a on-going debate, now-a-days, all over the world on allopathic and alternative medicines. It is a question of efficiency of the treatment not just for a sake of argument. In fact, they are not competitive but complimentary to each other. Allopathic treatment may be indispensable for certain ailments similarly alternative medicines are the best for certain ailments. Whatever may be the method of treatment but the cost of treatment and the outcomes are very important. However, the concept of “prevention is better than cure” is more economical and natural way of treatment for any human ailments.

Yoga solutions to Human ailments

Assanas to overcome hyper tension – vajrasana, padmasana, halasana, janusirasasana and pachimotasana

For obesity ---- suryanamaskar, pachimotasana, salabasana, dhanurasana, bhujangasana and vajrasana

To prevent diabetics – suryanamaskar, pachimotasana, salabasana, dhanurasana, bhujangasana, vajrasana, sarvangasana, halasana and Gomukasana

To overcome back ache --- suryanamaskar, pachimotasana, salabasana, dhanurasana, vajrasana and sethubandasana

Acupressure points for various human ailments

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>Gentle massage to thumb in equal intervals for three minutes</td>
</tr>
<tr>
<td>Headache due to indigestion</td>
<td>Gentle pressure to thumb and index finger</td>
</tr>
<tr>
<td>Headache with body pain, fatigue and no appetite</td>
<td>Gentle massage to thumb and little finger</td>
</tr>
<tr>
<td>Eye pain and related problems</td>
<td>Gentle massage to thumb and middle fingers</td>
</tr>
<tr>
<td>Cough and joint pain</td>
<td>Gentle massage to thumb and ring finger</td>
</tr>
<tr>
<td>Hormone imbalance and tension</td>
<td>Gentle massage to upper part of thumb and wrist</td>
</tr>
<tr>
<td>Cold, sneezing and cough</td>
<td>Gentle massage to all fingers except thumb</td>
</tr>
<tr>
<td>Insomnia</td>
<td>Keep the palms together and lock the fingers and give gentle pressure to both the palms alternatively</td>
</tr>
<tr>
<td>Stomach ache, indigestion and lethargy</td>
<td>Gentle massage to palm</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Gentle massage to thumb</td>
</tr>
<tr>
<td>Impotency, stomach ache during menstruation</td>
<td>Gentle massage to thumb and wrist in morning and evening</td>
</tr>
</tbody>
</table>

Conclusion

The concept of prevention is better than cure makes the treatment for any ailment simple, economical and natural. Man can be an independent entity as long as he goes inside and he gets whatever he wants. If he seeks his requirements from outside it will be inadequate and temporarily in nature. Deviation from nature means deviation from happiness. Through alternative medicines especially, acupressure, acupuncture, yoga and meditation man can prevent disease and keep good health. The techniques of alternative medicines will develop the inner abilities and cure human ailments without any drugs. To conclude, the alternative medicines will develop the degree of independence, and
reduce medical expenditures and improve the quality and health status of human capital. The practice of yoga, acupressure and acupuncture make the mankind healthy and wealthy. Thus, this approach not only keep our health intact but also protect the environment by reducing the degree of dependency on unwanted industrial products and save the mankind from the side effects of drugs.

Discussion

There are various medical research article related to human ailments. But still people are in confused state that allopathy is the best medical approach for medical treatment. Unfortunately, people fail to understand our Indian medicines and their reputation. The researcher related to public health, can concentrate in this research gap and try to augment.

Ethical Clearance: completed. (Dept. level committee at VELS)

Source of Funding: Self

Conflict of Interest: NIL

References


Enhancing the Role of Public Health Center as Gatekeeper on the National Health Insurance

Betri Anita¹, Henni Febriawati¹, Desri Suryani², Yandrizal¹, Bintang Agustina, Pratiwi¹, Wulan Angraini¹, Riska Yanuarti¹

¹Faculty of Health Sciences, University of Muhammadiyah Bengkulu, ²Health Polytechnic of Health Ministry Bengkulu, ³Student at Doctoral Program in Public Health Sciences University of Andalas Padang

Abstract

Public health center as a health care facility that organizes public health efforts and the efforts of individual health first rate, with more emphasis on promotive and preventive efforts that can reduce the number of hospital visits and referrals. The aim of the research is how to improve the role of public health centers as gatekeeper at the National health insurance.

The research used a qualitative method with the exploratory design. A case study approach (case study). The findings of qualitative methods in the form of support, obstacles, and challenges. Analysis Unit: ten public health centers. Primary and secondary data collected include healthy visit, the number of non-specialist referrals, and management efforts to improve the role of the public health centers.

The healthy visit percentage of ten public health centers in January - June 2016 was increased. Non-patient referral specialist was 0% from January to May 2015. Increasing of a healthy visit with enhancing visits and activities: Posyandu, Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM), School Health Unit (SHU), the Early Childhood Education (ECD) and Kindergarten, Company, and home visit. Mini workshop was done at Public Health Centers monthly to discuss the achievement of program indicators, the causes and solutions to improve the achievement of the following month, to enhance efforts to prevent disease, improving the quality of care, and provide an explanation to referred patients.

The role of health centers as gatekeeper enhanced public health efforts and the quality of health care of individuals involve stakeholders to empower the community in an effort to improve the early detection, prevention, and control of diseases.

Keywords: The role of public health centers, public health center Management, Stakeholder and Community Empowerment, Preventing and Controlling Diseases.

Introduction

Public health center as a health care facility that organizes first rate public and individual health efforts, with more emphasis on promotive and preventive efforts that can reduce the number of hospital visits and referrals by optimizing Posyandu, Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM), and management of the health center.

Disease prevention and control can be done by empowering the public health sector. Posyandu is one form resourced public health efforts managed and organized from, by and with the community in the implementation of health development, in order to empower communities and provide convenience to the public in obtaining basic health services.

Efforts to improve the ability of the community independently; prevention, disease control in various forms of activities such as neighborhood health center, maternal affection movement, nutrition, clean and healthy living behaviors (PHBs), mosquito nest eradication (PSN), poskesdes and disaster emergencies.
Lifestyle changes require a comprehensive approach and multi-dimensional.

Therefore the program should focus on the risk factors in an integrated comprehensive (promotive preventive, curative-rehabilitative) cover policy dimension, the environment, people’s behavior and the dimensions of health care, by empowering the community with the support of the Cross programs and sectors. The role of public health centers, stakeholders need to be optimized to achieve the goal of improving community participation in early detection, prevention, and control of diseases.

**Material and Method**

The study used a qualitative method approach with the exploratory design. A case study approach (case study). The findings of qualitative methods in the form of support, obstacles, and challenges. Analysis Unit: Four public health centers as health care facilities that organize the first rate of public and individual health efforts, with more emphasis on promotive and preventive efforts, to achieve the degree of public health as high as possible.

Primary and secondary data collected including input, process and evaluated the implementation of the Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM), Pasyandu, and public health center management. The Input covered the role of stakeholders, cadres, and available of facilities and infrastructure. The results of the research are used as a deepening and study the preparation of insurance policies in an effort to service efficiency. The study results in recommendations to increase the role of policy formulation stakeholder set out to promotive, preventive, motivate and incentives officers.

**Results**

A healthy percentage of visits of 11 (ten) PHC during January-June 2016 there was an increasing, Figure 1.

![Figure 1. Healthy visit percentage](image)

January and June each PHC

The hospital visit percentage of 9 (nine) Public Health Center during January - June 2016 were decreased and 2 (two) health centers were increased in Puskesmas G and J because of doing Home Visit to the ambulatory patients, thus increasing hospital visits. Home vision is an effort so that the conditions are controlled so that the patient should not be referred, see Figure 2.

![Figure 2. Hospital visit percentage](image)

The efforts made by the public health center to increase healthy excursions and visits by informants as:

To increase health visit as part of the indicator contact numbers, because of the hospital visit can not be searched or upgraded, then increase visits and activities: Posyandu, Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM), School Health Unit (SHU), the Early Childhood Education (ECD) and kindergarten, Company(10 informants). The Increasing if sick visits were done Home Visit (2 informants).

![Figure 3: Non-Specialistic Referral Percentage](image)

The efforts made by the public health center to not refer the patient so can be treated at the public health center are:

Provide education, explanation to the patients who ask referred to diagnose their illness that can be treated at the health center (10th informants), if there are still forced by reference but not stuffed diagnose disease, so patients are not accepted as a patient referral to an advanced health facility.
Public Health Center management evaluate actively toward the achievement of program indicators by mini workshop every month, all informants said:

*The Public Health Center Have done a mini workshop every month to evaluate the achievement of program and plan the achievement of the activities that will be conducted in the following months (10th informants).*

**Discussion**

Public Health Center (PHC) as the first level health facility has a gatekeeper function on the National Health Insurance. Starting in January 2016 in the city of Bengkulu applied a policy of norm-setting capitation and capitation payments based on the achievement commitment of service at health facilities first-rate, with indicators, among others, include the numbers of contacts (visits sick and healthy), the ratio of referral outpatient cases of non-specialist (RRNS). The efforts made by the health center to reach the indicator by an increase in promotion and preventive activities to increase the number of visits. PHC can be divided into two categories namely: First, the community health service centers ie primary health centers as promotive and preventive service providers with the target groups and communities to maintain and improve health and prevent disease, and; Second, public health centers as primary individual health care center where the role of PHC is defined as a gate keeper or first contact on the formal health care and referral accordance with standard medical services.¹

The Management of Public Health Center in an effort to improve the health, decrease the number of visits sick and referral to hospital, performed the increase in activity promotive and preventive efforts in Posyandu, Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM), School Health Unit (SHU), Early Childhood Education (ECD) and Kindergarten, Company, Increased visits sick do Home Visit to control the disease so that the patient need not be referred. Public health about disease prevention and control at the population level, through an organized effort that includes organizations, public, private and individual. Contribution to public health comes from systems outside the formal health care system, and the potential for cross-sectoral contribution to public health is increasingly recognized worldwide. The government’s role is very important in influencing the health of the population is not limited to the health sector but also by the various sectors outside the health system.²

Mini workshop conducted every month to discuss the PHC program achievement, causes and prevention solutions of high number disease of visits as well as work on improving the quality of care. PHC identify promotive and preventive efforts in the community so that it can be adapted to the needs of the community. Studi Nshimirimana (2016), review of doorman system, redefinition and strengthening of gatekeepers, capacity building, quality assurance, availability and strengthening of patient referral policies, staff motivation and best service practices for patients at community health centers³. Alberta Health (2016) recommends network policies health services assess community health needs by matching programs and community needs, allocating resources to priority areas, and evaluate to ensure the results were in line with objectives.⁴

Prevention is a prominent feature of health care reform that lasted the late 1960s, starting early 1970 in the United States, a strategy has been like a vaccination across the nation, the promotion of lifestyle changes and safety regulations were introduced and become widely accepted as a means to improve public health while reducing health care expenditures.⁵ Efforts to prevent non-communicable diseases have been developed through coaching Integrated Health Education Center for Non-communicable Disease/IHEC for NCDs (Posbindu PTM). Need strong evidence supports explanation lifestyle behaviors negative role in the incidence of chronic illness, and the role of positive lifestyle behaviors on the incidence and effective management⁶. Community involvement tend to be an important contributor to improving the health and service, has made remarkable progress and gained many benefits. Efforts to combine health care with public health disease prevention campaigns can to the success of American health sector⁷.

Study Mourad (2015), Widening the implementation of health information management systems will improve the function, effectiveness, efficiency, and performance of primary health care⁸.

Indonesia faces some challenges for the effective implementation of the Universal Health Coverage (UHC) in order to extend its coverage, especially in dealing with the condition of non-communicable diseases, which are generally chronic in nature, requiring management of patient case carefully from time to time, and the most cost aimed at primary care level⁹. Indonesian Public Health Center condition yet effective treatment of non-communicable diseases, require special efforts to prevent and control non-communicable diseases in order
not to burden the National Health Insurance program. Since the Chinese government was concerned by the low willingness of patients, gatekeeper policy was not done in China. Interestingly, this study showed that high willingness among patients reported to health insurance, to implement gatekeeper. These findings remind the health sector about the need to formulate a strategy to promote the implementation of the gatekeeper policy priorities. The Australian Government is fully responsible for primary health care funds and policies. The main initiative pushes major changes across the system together, these changes will occur ensuring a strong and effective primary health care system, which underlies the national health and hospital network for the future of Australia. The Policy in increasing the role of gatekeeper for first-level health facilities should be planned and executed well so that health care providers and participants can receive it.

**Conclusion**

Public Health Center as a health care facility that organizes first rate public and individual health efforts, with more emphasis on promotive and preventive efforts that can reduce the number of hospital visits and referrals to hospital. Implementation of gatekeeper policy would be beneficial to control health care costs with planned and implemented with a strategy that focuses on service providers and participants.

**Acknowledgements:** Thanks to Kopertis Region II, which has funded this research through DIPA Directorate of Research and Community Service, Directorate General, Dirjen Dikti TA. 2016. To the Chief Medical Officer of Bengkulu, All chairmen of Public Health Centers of Bengkulu City that has been willing to become informants.

**Ethical Clearance:** Health Research Ethics Committee, Faculty of Health Sciences, Muhammadiyah University of Bengkulu

**Conflict of Interest:** The author(s) declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

**References**

Involvement of \textit{KRAS} rs61764370 \textit{T}>\textit{G} Gene Variation in Leukemia Patients of Saudi Arabia

Osama Al-Amer\textsuperscript{1}, KF Alsharif\textsuperscript{2}, Rashid Mir\textsuperscript{1}, FM Abu-Duhier\textsuperscript{1}, Abdulraheem Almalki\textsuperscript{2}, Wayil Yassen\textsuperscript{3}

\textsuperscript{1}Department of Medical Laboratory Technology, Prince Fahd Bin Sultan Research Chair, Faculty of Applied Medical Sciences, University of Tabuk, Kingdom of Saudi Arabia, \textsuperscript{2}Departments of Clinical Laboratory Sciences, Faculty of Applied Medical Sciences, Taif University, Kingdom of Saudi Arabia, \textsuperscript{3}Departments of Oncology, King Salman Armed Forces Hospital, Tabuk, Kingdom of Saudi Arabia

Abstract

Background: Recently, a variant allele in the 3'UTR of the \textit{KRAS} gene (rs61764370 \textit{T}>\textit{G}) was shown to be associated with an increased risk for developing multiple cancer types like lung, ovarian and breast cancer. Therefore, we investigated the association of \textit{KRAS} (rs61764370 \textit{T}>\textit{G}) gene variation in leukemia susceptibility in our population.

Methodology: This population-based case–control study was done on 72 clinically confirmed Leukemia patients and 87 matched healthy controls with no history of any type of cancer. The \textit{KRAS} rs61764370\textit{T}>\textit{G} genotyping was detected by using Allele specific PCR.

Results: We observed a statistically significant difference in the frequencies of \textit{KRAS} \textit{TT}, \textit{GT} and \textit{TT} genotypes among patients and healthy controls (\(p=0.0271\)). This study reported significantly higher percentage of \textit{TT} (11\%), \textit{GT} (75\%) and \textit{GG} (14\%) genotypes in patients compared to controls TT (25\%), GT (69\%) and GG (06\%) genotypes while higher percentage of GG (14\%) genotype were reported in patients compared to control GG (6\%) genotypes. Our findings showed that the \textit{KRAS} rs61764370\textit{T}>\textit{G} variant was associated with an increased risk of Leukemia in codominant inheritance model (OR=5.5, 95\%CI=(1.43-21.0); RR=2.20, (1.04-4.64), \(p=0.038\) \textit{TT} vs \textit{GG}). Dominant inheritance model (OR=2.70, 95\% CI=(1.21-6.52); RR=1.45(1.10-1.91), \(p=0.007\) \textit{(TG+GG)} VS \textit{TT} and Recessive inheritance model (OR=2.64, 95\%CI= (0.86-8.13), RR (1.70(0.82-3.54) P=0.025 (GG vs TT+GT) tested. While, the G allele significantly increased the risk of Leukemia (OR= 1.57; 95\% CI= (1.03-2.45); RR 1.22(0.99-1.51) \(p=0.047\) compared to \textit{T} allele.

Conclusion: Our findings indicated that \textit{KRAS} rs61764370 \textit{GG} genotype and \textit{G} allele are associated with an increased susceptibility to leukemia in Saudi Arabian population. It can be used as a predisposing genetic marker for Leukemia. Further studies with larger sample sizes are necessary to confirm our findings.

Keywords: \textit{KRAS} rs61764370, SNP- Single-nucleotide polymorphism, Leukemia, OR-Odds ratio, CI-Confidence interval.

Introduction

In 2015, leukemia was present in 2.3 million people and caused 353,500 deaths.\textsuperscript{(1)} In 2012 it newly developed in 352,000 people.\textsuperscript{(2)} It is the most common type of cancer in children, with three quarters of leukemia cases in children being the acute lymphoblastic type. However, about 90\% of all leukemia’s are diagnosed in adults, with AML and CLL being most common in adults. It occurs more commonly in the developed world.\textsuperscript{(3)} The International Agency for Research on Cancer (IARC) estimated in Saudi Arabia, that the age-standardized incidence rate (ASIR) for leukemia was 3.0 per 100,000 populations in 2008, and the age-standardized mortality

Corresponding author:
Dr Osama Al-Amer, Department of Medical Laboratory Technology, Faculty of Applied Medical Sciences, University of Tabuk, Kingdom of Saudi Arabia.
The registry of King Faisal Specialist Hospital and Research Center (2011) recorded 6216 cases of leukemia admitted to the hospital during the years from 1975 to 2011. In 2008, the Saudi Cancer Registry (SCR) reported that leukemia ranked third in cancer incidence among the male population, and fifth among females. The ASIR of leukemia in Saudi Arabia is slightly low in comparison with other Arabian Gulf countries.

Three different human RAS genes have been identified: KRAS (homologous to the oncogene from the Kirsten rat sarcoma virus), HRAS (homologous to the oncogene from the Harvey rat sarcoma virus), and NRAS (first isolated from a human neuroblastoma). The different RAS genes are highly homologous but functionally distinct; the degree of redundancy remains a topic of investigation. RAS proteins are small GTPases which cycle between inactive guanosine diphosphate (GDP)-bound and active guanosine triphosphate (GTP)-bound forms. RAS proteins are central mediators downstream of growth factor receptor signaling and therefore are critical for cell proliferation, survival, and differentiation. RAS can activate several downstream effectors, including the PI3K-AKT-mTOR pathway, which is involved in cell survival, and the RAS-RAF-MEK-ERK pathway, which is involved in cell proliferation. RAS has been implicated in the pathogenesis of several cancers. Activating mutations within the RAS gene result in constitutive activation of the RAS GTPase, even in the absence of growth factor signaling. The result is a sustained proliferation signal within the cell.

Single nucleotide polymorphisms (SNPs), disrupting miRNAs, or miRNA binding sites have been demonstrated to be individually powerful biomarkers of cancer risk in humans. A gene polymorphism located in the 3′UTR of the KRAS gene (rs61764370 T>G) has been reported to disrupt a let-7 miRNA binding site which induced increased expression of KRAS in vitro and lower let-7 miRNA levels in vivo. In addition to oncogenic nature of KRAS, the KRAS gene (rs61764370 T>G) variant allele has been reported to confer an increased risk for developing non-small cell lung cancer (NSCLC), as well as ovarian cancer, although the results in NSCLC were not replicated, besides the KRAS-variant was shown to be a genetic marker of poor outcome as well in head and neck cancers. The higher frequency of KRAS gene (rs61764370 T>G) variant allele was reported in triple-negative Breast cancer in premenopausal women, Familial breast cancer patients. The KRAS-variant is an inherited, germline variant that has been demonstrated to serve as a genetic marker of increased risk of ovarian cancer. The KRAS-variant is easily tested in a blood or saliva sample; and has been shown to be at a high prevalence in ovarian cancer patients, being present in over 25% of patients with epithelial ovarian cancer, compared with 6% to 10% of the general population.

Limited studies are available from this part of the world therefore this study was aimed to investigate the association of KRAS gene (rs61764370 T>G) gene variations with leukemia susceptibility in Saudi Arabia.

Materials and Method

Sample collection

This population-based case–control study was done on 72 clinically confirmed Leukemia patients and 87 matched healthy controls with no history of any types of cancer and not related to the patients. Patients with any previous history of cancer were excluded from this study. After assessing the clinicopathological findings, a 4ml sample of peripheral blood was collected by venipuncture in EDTA tubes from each patient and healthy control.

DNA extraction

The DNA was extracted by using DNeasy Blood Kit (cat 69506) from Qiagen (Germany) as per the manufactures instructions. The extracted DNA was dissolved in nuclease-free water and stored at 4°C until use. Quality and integrity of DNA were checked by NanoDrop™ (Thermo Scientific, USA).

Genotyping for KRAS rs61764370T>G

The KRAS rs61764370 T>G genotyping was detected by using ARMS-PCR or Allele specific PCR. The ARMS or AS-PCR primers were designed by using Primer3 software as depicted in Table 1.
The ARMS-PCR was performed in a reaction volume of 25μL containing template DNA (50ng), FO -0.3μL, RO -0.3μL, FI-0.2μL, RI -0.2μL of 25pmol of each primers and 10μL from GoTaq® Green Master Mix (cat no M7122) (Promega, USA). The final volume of 25 μL was adjusted by adding nuclease free ddH₂O. Finally 2μl of DNA was added from each patient. The ARMS –PCR was converted to AS-PCR.

**Thermocycling conditions**

The amplification conditions used were at 94°C for 12 minutes followed by 35 cycles of 94°C for 35sec, 62°C for 40 sec, 72°C for 40 sec followed by the final extension at 72°C for 10 minutes. The amplification products were separated by electrophoresis through 2% agarose gel stained with 0.5μg/mL ethidium bromide and visualized on a UV transilluminator. Primers FO and RO flank the exon of the KRAS rs61764370T>G gene, resulting a band of 538bp to act as a control for DNA quality and quantity. Primers Fwt and RO amplify a wild-type allele (G allele), generating a band of 234bp, and primers FO and Rmt generate a band of 385bp from the mutant allele (T allele) as depicted in figure 1.

**Statistical analysis**

Deviations from Hardy-Weinberg disequilibrium (HWD) was calculated by Chi-square (χ²) goodness-of-fit test. Group differences were compared using Student’s two-sample t-test or one-way analysis of variance (ANOVA) for continuous variables and Chi-squared for categorical variables. Differences in the KRAS rs61764370T>G allele and genotype frequencies between groups were evaluated using Chi-square test. The associations between KRAS rs61764370T>G gene and risk of Leukemia were estimated by computing the odds ratios (ORs), risk ratios (RRs) and risk differences (RDs) with 95% confidence intervals (CIs). Allele frequencies among cases as well as controls were evaluated by using the Chi–square Hardy–Weinberg equilibrium test. A p-value < 0.05 was considered significant. All statistical analyses were performed using Graph Pad Prism 6.0 or SPSS 16.0.
Results

Study population:

This population-based case–control study was done on 72 clinically confirmed Leukemia patients and 87 matched healthy controls with no history of any types of cancer and not related to the patients. This research was approved by the Research ethics committee, University of Tabuk and written informed consent was obtained from all the subjects before enrollment.

Genotype distribution of \( \text{KRAS} \) rs61764370 T>G gene variation in Case-control:

The genotype distribution of \( \text{KRAS} \) rs61764370 T>G gene variation in cases and controls is summarized in Table 2. We observed a statistically significant difference in the frequencies of \( \text{KRAS} \) TT, GT and TT genotypes among patients and healthy controls (p=0.0271). This study reported significantly higher percentage of TT (11%) ,GT (75%) and GG (14%) genotypes in patients compared to controls TT (25%) ,GT (69%) and GG (06%) genotypes while higher percentage of GG (14%) genotype were reported in patients compared to control GG (6%) genotypes as depicted in table 2.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N=</th>
<th>TT</th>
<th>GT</th>
<th>GG</th>
<th>X2</th>
<th>DF</th>
<th>P value</th>
<th>T</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leukemia cases</td>
<td>72</td>
<td>08(11%)</td>
<td>54(75%)</td>
<td>10(14%)</td>
<td>7.16</td>
<td>2</td>
<td>0.027</td>
<td>0.48</td>
<td>0.52</td>
</tr>
<tr>
<td>Controls</td>
<td>87</td>
<td>22(25%)</td>
<td>60(69%)</td>
<td>05(6%)</td>
<td>0.60</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Allelic distribution of \( \text{KRAS} \) rs61764370T>G gene variation in Cases-controls:

The frequency of T allele (fT) was found to be higher among healthy controls (0.60) than the leukemia patients (0.48) whereas, the higher frequency of G allele (fG) (0.52) was observed among leukemia patients than the controls (0.40) as depicted in table 2.

Risk of Leukemia patients with \( \text{KRAS} \) rs61764370 T>G gene polymorphism:

A multivariate analysis based on logistic regression like odds ratio, risk ratio and risk difference with 95% confidence intervals were calculated for each group to estimate the association between the \( \text{KRAS} \) rs61764370 T>G variant and risk of Leukemia patients in Saudi patients as depicted in table 3. Our findings showed that the \( \text{KRAS} \) rs61764370 T>G variant was associated with an increased risk of leukemia in codominant inheritance model (OR=5.5, 95%CI= (1.43-21.0); RR=2.20, (1.04-4.64), p=0.038 TT vs GG and in case of dominant inheritance model (OR=2.70, 95% CI= (1.21-6.52); RR=1.45(1.10-1.91),P=0.007 (TG+GG) VS TT and recessive inheritance models (OR=2.64, 95% CI= (0.86-8.13), RR (1.70(0.82-3.54) P=0.025 (GG vs TT+GT) tested. While, the G allele significantly increased the risk of leukemia (OR= 1.57; 95% CI= (1.03-2.45); RR 1.22(0.99-1.51) P=0.047 compared to G allele as depicted table 3.

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>Healthy controls</th>
<th>Leuk patients</th>
<th>OR (95% CI)</th>
<th>Risk Ratio(RR)</th>
<th>P-Val</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(N=87)</td>
<td>(N=72)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KRAS-TT</td>
<td>22</td>
<td>8</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>KRAS-TG</td>
<td>60</td>
<td>54</td>
<td>2.47 (1.01-6.01)</td>
<td>1.39(1.05-1.83)</td>
<td>0.019</td>
</tr>
<tr>
<td>KRAS-GG</td>
<td>05</td>
<td>10</td>
<td>5.5(1.43-21.0)</td>
<td>2.20(1.04-4.64)</td>
<td>&lt;0.038</td>
</tr>
<tr>
<td>Dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KRAS-TT</td>
<td>22</td>
<td>8</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>KRAS - (TG+ GG)</td>
<td>65</td>
<td>64</td>
<td>2.70(1.12-6.52)</td>
<td>1.45(1.10-1.91)</td>
<td>&lt;0.007</td>
</tr>
</tbody>
</table>
In this study, we found that KRAS rs61764370 T>G variant is associated with an increased susceptibility of leukemia patients.

**Discussion**

A multivariate analysis based on logistic regression like odds ratio, risk ratio and risk difference with 95% confidence intervals were calculated for each group to estimate the association between the KRAS rs61764370 T>G variant and risk of Leukemia patients in Saudi patients as depicted in table 3.

The results of our study indicated that the KRAS rs61764370 T>G variant was associated with an increased risk of Leukemia in codominant inheritance model (OR=5.5, 95% CI= (1.43-21.0); RR=2.20, (1.04-4.64), p=0.038 TT vs GG and in dominant inheritance model (OR=2.70, 95% CI= (1.21-6.52); RR=1.45(1.10-1.91),P=0.007 (TG+ GG) VS TT and .Also it was reported that the G allele was significantly increased the risk of leukemia with OR= 1.57; 95% CI= (1.03-2.45); RR 1.22(0.99-1.51) P value =0.047 compared to T allele. The current study confirmed the relationship of KRAS gene polymorphisms and the risk of Leukemia in the Saudi Arabian population.

In accordance with one of the study findings, indicated that KRAS rs61764370 polymorphism was associated with the risk of double primary breast and ovarian cancer. Similar results were showed in another study that the KRAS variant is a risk factor for triple negative breast cancer in premenopausal women highlighting its role as a genetic marker. Since the characterization of the KRAS miRNA-related SNP known as KRAS-LCS6 (rs61764370), there have been a number of studies on the relationship of its genotype with risk and prognosis of several cancers, with many such studies directed toward cancer outcome. The rs61764370 SNP is located in the 3'UTR region of the KRAS oncogene, and its derived allele has been associated with an increased expression of KRAS by weakening the microRNA let-7 binding to KRAS mRNA. This variant has been associated with an increased risk of triple-negative breast cancer, non–small cell lung cancer, and ovarian cancer. The GTPase protein encoded by KRAS, and the miRNA let-7 are involved in the regulation of proliferation, differentiation, and apoptosis. In fact, let-7 is a master regulator in the differentiation process of normal hematopoietic stem cells while activating mutations in KRAS are one of the most common events in cancer development.

**Conclusion**

Our findings indicated that KRAS rs61764370 GG genotype and G allele are associated with an increased susceptibility to leukemia in Saudi Arabian population. Furthers studies with larger sample sizes are necessary to confirm our findings.

**Acknowledgement:** We acknowledge the support from the Deanship of Scientific Research for funding this research. We are grateful to the patients with whose cooperation this study was possible.

**Disclosure:** This manuscript is not under consideration by any other publication and has not been published elsewhere. Authors have declared that no competing interests exist.

**Consent:** The study was approved by the Research ethics committee, University of Tabuk. All study activities and experiments have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

**References**

1. GBD 2015 Mortality and Causes of Death, Collaborators. (8 October 2016). “Global, regional, and national life expectancy, all-


Prevalence and Risk Factors of Hypertension Stage 1 in Banjar Ethnic, South Kalimantan, Indonesia: Finding from the Indonesia Family Life Survey (IFLS) 5

Ahmad Taufik Azis¹, Syahrizal Syarif²
¹Master of Epidemiology, ²Departement of Epidemiology, School of Public Health, University of Indonesia

Abstract

Objective. Basic Health Research or Riskesdas 2013 showed that the prevalence of hypertension in South Kalimantan was 30.8%, the second highest prevalence and above prevalence in Indonesia (25.8%). The majority of Banjar Ethnic (65%) living in the area of South Kalimantan are also at risk of hypertension.

Method. This is a cross sectional study. Subjects in this study were the age group ≥18 years who were followed by the interview and had complete data. We investigated risk factors of hypertension stage 1. The data is derived from secondary data from the Indonesian Family Life Survey (IFLS) 5.

Result. The prevalence of hypertension stage 1 in Banjar Ethnic is 16.6% among respondent. The dominant risk factors for hypertension stage 1 in the Banjar Ethnic are obesity, PR=2.726 (95%CI:1.913-3.886), age≥45 years PR=2.146 (95%CI:1.482-3.107) dan male PR=1.641 (95%CI:1.149-2.344).

Conclusion. Obesity, age and gender are determinant for hypertension stage 1 in Banjar Ethnic. It is recommended to routinely check blood pressure, especially for people aged ≥45 years and maintain an ideal body weight in people of Banjar Ethnic.

Keywords: Hypertension stage 1, risk factors, Banjar Ethnic

Introduction

Non-communicable diseases are one of the biggest causes of death in the world, and it predict will increase from 38 million deaths in 2012 to 52 million deaths in 2030. In countries with lower middle income, non-communicable diseases are around 48%. Hypertension is one of the non-communicable diseases which become the global concern and have caused 9.4 million deaths and 7% of the world’s disease burden. According to World Health Organization (WHO), in 2014, the prevalence of hypertension in adults aged 18 years and over is around 22%. Research conducted in Southeast Asia shows that the prevalence of hypertension in Malaysia is 43.5%, Myanmar 30.1%, Vietnam 23.7%, and Sri Lanka 23.7%. The prevalence of hypertension in Indonesia in 2007 at the age of ≥40 years was 47.8%6 and in 2015 was 33.4% at the age of ≥18 years and it higher than the prevalence globally7.

Various risk factors have been found to be linked with hypertension, including socio demographics (age, gender, level of education, marital status, residence)4-6,8, various dietary behaviors were also associated with hypertension, including fruit and vegetable intake9 and fast food10. Higher body mass index (BMI) has been found to be positively associated with hypertension11. A Number of studies found that there was an association between physical activity12, smoking behavior13, and hypertension.

Ethnic/race is one of the risk factors of hypertension. Based on a study conducted by Suglia et al., in 2012, the prevalence of hypertension was higher in black women compared to white (16% versus 12%), in Hispanic’s men having a higher prevalence of hypertension compared to white (29% compared to 25%)14. Similarly, research
on ethnic Rob and Dolan in Xianjiang China by Abdukeram stated that there were significant differences in the prevalence of hypertension in these ethnic groups (28.77% and 14.75%).15

The majority of Banjar Ethnic (65%) who is living in the area of South Kalimantan are also at risk of hypertension.16 This can be seen from the results of the Basic Health Research in 2013 showed that the prevalence of hypertension in South Kalimantan was 30.8%, much higher than the national prevalence of 25.8%.17 Based on the data above, researchers were interested in knowing more about the prevalence and risk factors for hypertension in the Banjar Ethnic.

**Method**

**Ethical Consideration**

The IFLS has been approved by ethics review boards of RAND and University of Gadjah Mada in Indonesia. Written informed consent was obtained from all respondents before data collection was carried out.18

**Study Design**

This study uses a cross-sectional design using data from the Indonesian Family Life Survey-5 in 2014.

**Study Population**

The population observed in this study was the respondents of the Banjar Ethnic as many as 1,074 people from IFLS’s data. Inclusion criteria were ≥18 years old, did not take hypertension drugs. Calculation of sample size in this study uses the population data formula to test the hypothesis. Based on these calculations it is known that the largest sample size is 745 respondents. Sampling by means of total population because it meets the minimum sample requirements. The sample size used is 765 respondents.

**Socio-Demographic Characteristics and Risk Factors**

We include demographic information and individual characteristics (age, gender, education level, residence, and marital status), vegetable consumption, fruit consumption, physical activity and obesity as risk factors analyzed in this study.

**Blood Pressure Measurement**

Blood pressure was measured three times by specially trained nurses, using Omron’s self-inflating digital sphygmomanometers while participants were in a sitting position. The average of the three measurements is used for the current analysis. Blood pressure was classified using JNC VII. Hypertension stage 1 was defined as Systolic Blood Pressure (SBP) 140-159 mmHg or Diastolic Blood Pressure (DBP) 90-99 mmHg.19

**Measurement of Body Size**

Body mass index (BMI <25 kg/m2: normal weight; and ≥25.0 kg/m2)20, obesity derived from the height and weight measured during the physical examination. Height measured by the Shorr measurement board and weight was measured using the Seca floor-model scale developed in collaboration with UNICEF. In this study the measurement of body weight and height was carried out by the interviewer or enumerator who was competent in his field and had received previous training.

**Data Analysis**

Descriptive statistics were used to describe the study variables of the study population, Chi Square test to calculate difference in proportion and Cox Regression analyses were used to test significant determinant of hypertension status. Both the 95% confidence intervals and P value were adjusted considering the survey design of the Study. All analyses were conducted with SPSS 20 for Windows.

**Result**

In the present study, 765 samples met the inclusion requirements. The prevalence of hypertension stage 1 in Banjar Ethnic is 16.6% among respondent. The proportion of hypertension stage 1 increases with age. The largest proportion in the age group ≥45 years (28.4%) compared the age group <45 years (13.8%). The proportion of hypertension stage 1, men were higher (19.5%) compared to women (14.0%). In respondents with low education, the proportion of hypertension stage 1 incidence in is 19.2% (table 1).

The proportion of hypertension stage 1, who live in rural areas are more (17.3%) compared to those living in urban areas (15.2%). In respondents with marital status, the proportion of hypertension stage 1 was higher in divorce (25.4%) compared to single (12.0%) and married.
(16.5%). In table 1 it can be also be seen that the proportion respondents with less vegetable and fruit consumption (15.9%), less physical activity (13.8%) suffer from hypertension stage 1. The proportion of hypertension stage 1, obese were higher (28.4%) compared to with non-obese people (11.7%) (Table 1).

Table 1. Frequency of Hypertension Stage 1 According to Individual Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Hypertension Stage 1</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>n = 127</td>
<td>n = 638</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Age Category(years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 45</td>
<td>85</td>
<td>532</td>
</tr>
<tr>
<td></td>
<td>13.8</td>
<td>86.2</td>
</tr>
<tr>
<td>≥ 45</td>
<td>42</td>
<td>106</td>
</tr>
<tr>
<td></td>
<td>28.4</td>
<td>71.6</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>56</td>
<td>344</td>
</tr>
<tr>
<td></td>
<td>14.0</td>
<td>86.0</td>
</tr>
<tr>
<td>Male</td>
<td>71</td>
<td>294</td>
</tr>
<tr>
<td></td>
<td>19.5</td>
<td>80.5</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>47</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>13.5</td>
<td>86.5</td>
</tr>
<tr>
<td>Low</td>
<td>80</td>
<td>337</td>
</tr>
<tr>
<td></td>
<td>19.2</td>
<td>80.8</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>87</td>
<td>415</td>
</tr>
<tr>
<td></td>
<td>17.3</td>
<td>82.7</td>
</tr>
<tr>
<td>Urban</td>
<td>40</td>
<td>223</td>
</tr>
<tr>
<td></td>
<td>15.2</td>
<td>84.8</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>12</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>12.0</td>
<td>88.0</td>
</tr>
<tr>
<td>Married</td>
<td>100</td>
<td>506</td>
</tr>
<tr>
<td></td>
<td>16.5</td>
<td>83.5</td>
</tr>
<tr>
<td>Divorce</td>
<td>15</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>25.4</td>
<td>74.6</td>
</tr>
<tr>
<td>Fruit and Vegetable Consumption*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>64</td>
<td>304</td>
</tr>
<tr>
<td></td>
<td>17.4</td>
<td>82.6</td>
</tr>
<tr>
<td>Less</td>
<td>63</td>
<td>334</td>
</tr>
<tr>
<td></td>
<td>15.9</td>
<td>84.1</td>
</tr>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>96</td>
<td>445</td>
</tr>
<tr>
<td></td>
<td>17.7</td>
<td>82.3</td>
</tr>
<tr>
<td>Less</td>
<td>31</td>
<td>193</td>
</tr>
<tr>
<td></td>
<td>13.8</td>
<td>86.2</td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>63</td>
<td>477</td>
</tr>
<tr>
<td></td>
<td>11.7</td>
<td>88.3</td>
</tr>
<tr>
<td>Yes</td>
<td>64</td>
<td>161</td>
</tr>
<tr>
<td></td>
<td>28.4</td>
<td>71.6</td>
</tr>
</tbody>
</table>

*vegetable: green leafy vegetables and or carrots; fruits: banana and/or mango and/or papaya.
Table 2. Final Model Multivariate Analysis between Risk Factors and Hypertension Stage 1 in the Banjar Ethnic

<table>
<thead>
<tr>
<th>Variabel</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>PR</th>
<th>95.0% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Obesity</td>
<td>1.003</td>
<td>.181</td>
<td>30.793</td>
<td>1</td>
<td>.000</td>
<td>2.726</td>
<td>1.913</td>
</tr>
<tr>
<td>Male</td>
<td>.496</td>
<td>.182</td>
<td>7.426</td>
<td>1</td>
<td>.006</td>
<td>1.641</td>
<td>1.149</td>
</tr>
<tr>
<td>Age≥45 years</td>
<td>.763</td>
<td>.189</td>
<td>16.338</td>
<td>1</td>
<td>.000</td>
<td>2.146</td>
<td>1.482</td>
</tr>
</tbody>
</table>

Note: Adjusted by education level, residence, marital status, vegetable and fruit consumption, and physical activity.

Based on table 2, it is known the model of risk factors hypertension stage 1 in the Banjar Ethnic. The determinants for hypertension stage 1 in the Banjar Ethnic are Obesity, PR=2.726 (95%CI:1.913-3.886), Age≥45 years PR=2.146 (95%CI:1.482-3.107) dan Male PR=1.641 (95%CI:1.149-2.344).

### Discussion

In this study, the prevalence of hypertension stage 1 was 16.6% from 765 respondents. Based on the research of IFLS 5 in 2014 showed that the prevalence of hypertension stage 1 in Indonesia using the JNC-VII blood pressure category was 15.6%21. According to WHO in 2011, the prevalence of hypertension will continue to rise sharply and is predicted in 2025 about 29% of adults worldwide suffer from hypertension.

The results of this study also showed that obesity has a significant factor of hypertension stage 1 in the Banjar Ethnic. Research conducted by Rohkuswara and Syarif also found that obese respondents (BMI≥25) had a risk of 1.681 times to suffer from hypertension stage 1 compared to those who were not obese22. This finding also similar with research conducted by Jullaman, that the people with BMI were obese (>25-27kg/m²) at a risk of 1.06 times for hypertension stage 1 compared to those belonging to a normal BMI23. According to Messerli and Frisoli (2013) that by doing a weight reduction of about 5.1 kg it can reduce systolic blood pressure (SBP) by 4.4 mmHg. The BMI is recommended using the Body Mass Index (BMI) criteria, which is between 18.5 - 24.9 kg/m²24.

The results of the statistical test showed that age of the respondent the higher the risk of hypertension. Respondents with age ≥ 45 years were higher at risk of developing hypertension stage 1 compared to respondents aged <45 years. This is in line with the research conducted by Rohkuswara in 2017 that the age group 41-50 years had a risk of 5.541 times suffering from hypertension stage 1 compared to those aged 20-30 years22. The research conducted by Jullaman also shows that the higher the age of the respondent the more risk of suffering from hypertension stage 1, namely age 31-43 years PR = 1.7 (95% CI: 1.076-2.711), age 44-53 years, PR = 2.09 (95% CI: 1.773-4.095), age> 53 years, PR = 4.33 (95% CI: 2.902-6.471)23. The high risk of hypertension is similar with increasing age, caused by changes in the structure of large blood vessels, so that the lumen becomes narrow and the walls of blood vessels become stiff, as a result of increased systolic blood pressure25.

The results of this study also showed that male has a significant relationship with the hypertension stage 1 the Banjar Ethnic. Research conducted by Sari showed that men at risk of 1,620 times suffering from hypertension stage 1 compared to women26. More men experience the possibility of hypertension than women, often triggered by unhealthy behavior (smoking and alcohol consumption), depression and low employment status, feeling less comfortable with work and unemployment25. In addition, the level of concern for women in treating and controlling blood pressure is higher than that of men27.

### Conclusion

According to the findings of present study it can be concluded that obesity, age ≥45 years and male are the determinant in hypertension stage 1 in the Banjar Ethnic.
Based on this finding, there is need for recommended to routinely check blood pressure, especially for people aged ≥45 years and maintain an ideal body weight.

**Study Limitation**

The results obtained in the study are likely still influenced by the selection bias when viewed from aspects such as the selection process of the research population, the use of cross-sectional design which is only carried out at one time. The use of cross-sectional design has weaknesses, because there is no clear temporal time relationship, resulting in the aspect of causality becoming blurred, measurement of fruit and vegetable consumption variables, and physical activity is strongly influenced by the memory of the respondent, so that it is vulnerable to bias information.

**Conflict of Interest:** The authors declare that they have no conflicts of interest.

**Acknowledgment:** The research was conducted based on the IFLS-5, conducted by RAND. We than RAND for providing the access to the survey data and the study participants who provided the survey data.

**Source Funding:** This study was supported by my self

**References**

13. Leone A. Smoking and hypertension: independent or additive effects to determining vascular damage?


26. Sari DM. Association between Abdominals Obesity and Incident Hypertension Stage 1 in Pos Pembinaan Terpadu Non Communicable Disease Control Padang Panjang City (Based on Studi Technical Need Assesment For Prevention and Control of Diabetes in Community Based Inter. University of Indonesia; 2013.

Evaluation of Some Biochemical Markers in Patients Serum of Myocardial Infarction and Heart Failure

Ahmed Salih Lateef 1, Saddam Jumaa Nasser2, Ayad Abdulrazzaq Mutar1

1Department of Medical Laboratory Techniques, AL-Ma’arif University College, Ramadi, Anbar, Iraq, 2Department of Pharmaceutics, College of Pharmacy, University of Anbar, Ramadi, Anbar, Iraq

Abstract

Heart disease is a common disease in the world and lead to the mortality. The aim of this study is to evaluate the diagnostic values of serum biochemical markers such as hs-CRP, LDH and myoglobin in patients with some heart diseases such as (AMI) and (HF). Hs-CRP and myoglobin were estimated by using a sandwich immune detection method, and LDH activity by enzymatic method using semi-automated chemistry analyzer. Our data revealed that serum hs-CRP, LDH, and myoglobin levels showed a high significant differences in patient groups compared with control group, whereas comparison patient groups between them also showed high significant differences except in hs-CRP levels they were indicates no significant values. Also LDH levels showed high significant in both patient groups compared with the levels of hs-CRP and myoglobin. Finally these parameters now play significant role in the diagnosis of disease and our finding suggest that the elevated levels of hs-CRP, LDH and myoglobin are a significant predictor and considered markers for myocardial damage and necrosis.

Keywords: Biochemical Markers, Myocardial Infarction, Heart Failure, hs-CRP, Myoglobin, LDH

Introduction

Cardiovascular disease influences approximately seventy million americans, and each year an estimated eight million patients enter the emergency unit with symptoms of ischemic heart disease (1). HF is the final state of all heart diseases and public health problem especially in geriatric people (2). Many pathologic factors can cause myocardial injury, which is followed by cardiac remodeling and congestive HF (3). AMI is the main cause of morbidity and mortality in world and acute state of necrosis of the myocardium resulting from disproportion between myocardial metabolic demands and the coronary supply of oxygen and nutrients (4-5). Everyday innumerable number of patients report with chest pain, but only ten percent to fifteen percent have MI (6). All patients with AMI can be considered “high risk” and necessary be treated strongly (7). AMI can be diagnosis spontaneously by chest pain, ECG features, and elevation in serum markers (8).

Hs-CRP is the test used for detection of serum CRP concentration at lower levels (9). Increased CRP concentrations in obesity are associated with more severe metabolic derangements, also in CAD higher CRP concentration are participate with adverse vascular outcomes (10). Estimation of inflammation parameters as hs-CRP may provide a new technique for detecting population at high risk of plaque rupture (11). Many researchers suggest that hs-CRP is a useful indicator of cardiovascular risk (12). The high values of hs-CRP are an independent indicator of prognosis in Chronic HF (13). Myoglobin is a kind of protein which is selected intra muscle tissues and it is able on linking oxygen and iron and carrying them through metabolism. It is specifically exist in myocardium and skeletal muscles so that the release of myoglobin in the blood serum predict a muscle damage, hence myoglobin is considered as one of the most sensitive biomarkers for AMI, especially at the primary stages (14). LDH is serological marker for
the estimation of infarct size, serum concentration of LDH is mostly used. It’s catalysis the conversion of pyruvate to lactate. LDH-1 to LDH-2 increase over baseline approximately ten hours following MI, peak at about 24 to 48 hours and maintain at levels in the blood for up to fourteen day after MI.

**Materials and Method**

This study was conducted at AL-Ramadi Teaching Hospital / Iraq, during the period from December 2017 to October 2018. The study included 25 subjects, (5) subjects were normal healthy controls (both sex) and the mean of age between (20-55 years), (20) patients were admitted to the intensive cardiac care unit, and these patients were divided to two groups, patients suffering from AMI (n=10), and patients suffering from HF (n=10) (both sex) and the range of their age between (50-75 years). All patients undergone clinical and laboratory evaluation, and diagnosed clinically according to the combination of chest pain, detailed clinical history, ECG features, and elevated in cardiac markers such as [CK-MB and cardiac troponin T].

The hs-CRP, myoglobin, and LDH levels of these patients with (HF and AMI) were measured after admission and their peak level were recorded. Hs-CRP and myoglobin were estimated by using a sandwich immune detection method supplied from Ichroma company. LDH activity was measured by using enzymatic method using semi-automated chemistry analyzer supplied by Linear Chemicals Company. About (5) ml of venous blood samples were taken after admission, allow it to clot, separated by centrifuge and serum was collected and stored at (–20°C) until analysis biochemical markers.

**Results**

Serum hs-CRP levels were significantly higher in patient groups as compared with control group (HF= mean ± SEM 10.156 ± 0.286, AMI = mean ± SEM 9.291 ± 0.170 versus control group = mean ± SEM 10.75 ± 0.125, p <0.05), and this study showed also significant differences in patients group between them revealed no significant differences (Fig 1) illustrates the hs-CRP levels among different groups in this study.

Figure 1: The mean levels of hs-CRP in patient groups and control group

Our study revealed that the levels of LDH enzyme activity in patients with HF and AMI show a higher significant differences compared with control group (HF= mean ± SEM 507.633 ± 3.253, AMI= mean ± SEM 948.406 ± 7.058 versus control group = mean ± SEM 224.333± 3.274). But when the comparison of patient groups between them, it was observed significant difference in patient with HF compare with AMI as shown in (fig 2).

Figure 2: The mean levels of LDH enzyme activity in patient groups with control group

This study indicate as shown in the (Fig 3) significant increases in myoglobin levels in both patient groups compared with control group (HF= mean ± SEM 111.929 ± 0.930, MI = mean ± SEM 91.492 ± 0.512, versus control group = mean ± SEM 11.051 ± 3.274, p <0.05), and this study showed also significant differences in patients group between them.

Figure 3: The mean levels of myoglobin in serum of patient groups with control group
Having established that the patients of HF had a high levels of all biochemical markers, the effects of HF group on hs-CRP, LDH and myoglobin were evaluated. fig (4) Explained amazing results and showed that LDH enzyme activity was highly significant in patients of HF compare with others biochemical markers (LDH = mean ± SEM 507.633 ± 3.253, in contrast hs-CRP = mean ± SEM 10.156 ± 0.286, and myoglobin = mean ± SEM 111.929 ± 0.930).

![Figure 4: The mean levels of serum hs-CRP, LDH, and myoglobin in Patients with HF](image)

The effect of MI on biochemical markers was demonstrated previously and all had significant differences (Fig. 5) showed the effect of MI upon all markers mentioned above, and revealed that LDH enzyme levels are highly significant compared with hs-CRP and myoglobin (LDH = mean ± SEM 948.406 ± 7.058, versus hs-CRP = mean ± SEM 9.291 ± 0.170, and myoglobin = mean ± SEM 91.492 ± 0.512).

![Figure (5): The mean levels of serum hs-CRP, LDH, and Myoglobin in Patients with MI](image)

Discussion

The biochemical markers have significant role in the diagnosis of diseases (17). However, according to the American heart association recommendations the hs-CRP values less than 1 mg/L are classified as low risk, the values between 1-3 mg/L classified as average risk and over 3 mg/L is classified as high risk for coronary heart disease (18). In this study patients with (HF, MI) have hs-CRP levels more than 3 mg/L and according to statistical analysis our study showed the significant differences in hs-CRP levels in patient groups (HF, MI) compared with control group. Hs-CRP is inflammatory biomarker; It is elevate in the blood and considered risk factor for many clinical disorders such as cardiovascular diseases and other acute systemic inflammation as well as considered a good marker of myocardial damage but it is not sensitive as troponin I in diagnosis (19-20). This study comes in agreement with studies by (Rathore et al 2015; Yin et al 2004) findings more significant values of CRP in patients suffering from AMI compared in control group, and more significantly with the severity of CHF (13). Also the results revealed not significant differences in hs-CRP levels in patients groups between them as shown in (Fig. 1).

Hs-CRP levels indicates poor prognosis and it also increases risk of long term complications and risk of HF, This finding also was in agreement with the study (Chaudhary and Chhotala, 2016) are consistent with the present study found the hs-CRP increased in patients with MI and suggest that Patients with MI who have higher values (>3mg/L) of hs-CRP on admission are very much prone to develop HF in the future and related morbidity and mortality as compared to those with normal or near normal hs-CRP levels on admission (21).

The normal range of serum LDH enzyme activity from 140-290 IU/L compared with this normal variation (15). Our data demonstrated a high significant differences in LDH enzyme activity in patient groups especially in MI group compared with control group (fig. 2). When myocardial cells damaged because insufficient oxygen supplying or nutrients, the membrane of cardiac becomes permeable or may be led rupture, resulting in release of cytosolic enzymes into the circulatory system with concomitant increases of their serum concentrations (5). The outcomes of our research revealed that high significant between patients of MI compared with HF, and this automatically because the LDH activity specific in diagnosis of MI more than HF. In study done by (Karmen et al; 1950) demonstrated that necrotic cardiac myocytes causes the enzyme release and can be detected in the serum and could aid in the diagnosis of MI (17) .The findings of our study was in agreement particularly with the previous study done by (Vyš et al; 2017) they were found that out of 55 patients who actually diagnosed to have AMI, the LDH enzyme was elevated in 36 patients, in 19 patients in spite of having AMI it remained in normal range (20).
Our study findings the myoglobin levels in serum were shown high significant differences in both patient groups (HF, MI) as compared with control group especially HF group which gives strong peak as explain in (fig. 3). Myoglobin released more rapidly into blood than any other cardiac marker (16). This data also found the high significant deferences in patients of HF compare with MI in myoglobin, this may be due to time differences for draw blood samples, drugs and other risk factors associated with HF group that led to this finding. The clinical specificity of myoglobin is poor because its found not only in cardiac cells but also in skeletal muscle cells (17). So its cannot be used as a lone in diagnostic parameters, but in combination with troponins or CKMB (22).

Finally the (Figs 4,5) confirm the results obtained for comparison between the patient groups compared to the control group as well as the comparison between the patient groups with each other which were previously illustrated in Figs. 1, 2 and 3. Also indicate that the activity of LDH enzyme activity was the most influential and most significant in both patient groups (HF and MI) compared with other biochemical markers. This is because the LDH enzyme is the most specialized in the cardiac muscle of other variables, and because its contain on 5 isoenzymes especially the isoenzymes LDH1 and LDH2. The LDH-1 isoenzyme found in the heart muscle and LDH-2 is found predominantly in blood serum. A high LDH-1 to LDH-2 suggest MI (6).

Statistical Analysis

Statistical meaning of variances among means values from control and treated groups applied by specific (ANOVA) test via Graph Pad Prism ® Version 5.0 software or Bonferroni Multiple Comparison test. p<0.05 established as significant.

Conclusion

All biochemical markers levels examined in this study showed the high significant differences in the patient groups (HF and AMI) compared with control group, but when we compare the results of patient groups between them, only hs-CRP levels don’t revealed any significant differences. On the other hand LDH enzyme activity showed high significant levels in both patients group as compared with hs-CRP and myoglobin. Finally these findings suggest that an elevated level of hs-CRP , LDH and myoglobin are a significant predictor and considered the markers of myocardial damage but not as much sensitive and specific as Troponin I and CK-MB . So for the early diagnosis and intervention of AMI these markers are very helpful and can provide additional prognostic information for the risk stratification and treatment in patients with HF and AMI.

Acknowledgment: The authors thankful AL-Ramadi’s Teaching hospital, Anbar, Republic of Iraq, and thank biologist Omer AL-Jumaily and chemist Abdullah AL-Dosary for their collaboration and supplying instruments and help us in blood samples in this study.

Ethical Clearance / Taken from Al-Ramadi Teaching Hospital committee

Source of Funding / Self

Conflict of Interest / Nil

References

6- Batta A, Panag K, and Singh J. Cardiac markers-role in diagnosis of myocardial infarction. International Journal of Current Biological and


Comparative Study between Ultrasound Finding and Retrograde Urethrography to Evaluate Urethral Stricture

Ahmed Turki Obaid
Assistant Professor/ College of Medicine / Babylon University / Consultant Urologist / Urology Department / Hilla Teaching Hospital/ Babylon province / Iraq

Abstract

The urethrogram is implemented in a retrograde style. Sonourethrography is applied chiefly as an escort performance in an assessment of urethral stricture infection by the chief benefit occurring to improved valuation of related spongiofibrosis. The report was aimed to make comparative among ultrasound finding and retrograde urethrography to assess urethral stricture. The test evaluation at showed in the imaging division of Hilla Teaching Hospital in Babylon (Iraq) from Dec, 2017 to Oct, 2018 containing 95 patients. The records were then analyzed by the use of SPSS version 14. The outcomes of RUG, 22 patients (66.7 %) were be ill with local stricture, and 11 (33.3 %) was analyzed for distributed stricture. In Sonourethrography (SUG) imaging, 16 (48.5 %) were analyzed for local stricture, and 17 (51.5 %) was analyzed for distributed stricture. Finally, the outcomes completely realized over ultrasound were frequently apprehensive by the actuality of varied and echogenic masses external the urethra and the irregularities of the internal wall of the urethra.

Keyword: Sonourethrography, Urethrography, urethral stricture

Introduction

The urethrogram was the elderly radiographic examination to evaluating urethral stricture infection, and rests the traditional for analysis and performance. Most frequently, the urethrogram was implemented on a retrograde style. The analysis originates by a scout picture to evaluate skeletal arrangements as justly as an attendance of several solidified urinary territory pathology. Consequently, 25 - 33 mL of water solvable iodine founded on difference average was inserted to the urethra below straight fluoroscopic or radiographic concept, and numerous imageries are acquired. This is recognized as the self-motivated, that it permits for living valuation of the urethra as difference was brought (Choudhary, 2014).

Indecorous locating would position the urethra at an viewpoint relation to the image, and effect in irony of stricture dimension. The penis would been located on extend in command to increase whole valuation of the . A service of saturated lubrication may unclear the picture, persuade edema, and offer debatable advantage of patient relaxation. Contrast would be imagined over the to permit imaging of the urethral proximal for the, in command to guarantee that the complete amount of is imagined (Pavlica P, 2013). The significance of patients locating is established in figure 1

Figure 1 A illustrative RUG

Around the three key topographies of a stricture which are a RUG necessity classify, containing position of the, the dimension of the, and concurrent urethra pathology. The urethra is classically separated into an posterior and frontal section. The frontal urethra was included of the navicularis and penile urethral, and finally bulbar urethral. The later urethra is included of
the, and finally prostatic urethral (Cheng, 2018). The division of standard urethral structure on RUG was shown on figure 2.

**Figure 2 Standard RUG representative**

The caliber of a frontal urethra would been flat and unchanging from the to a penobulbar connection. In fact, the bulbar urethra receipts a slight S formed alteration in sequence, that is naturally relates to the penoscrotal connection. Intermittently, smooth tissue shapes of the may be recognized, supporting in the documentation of these milestone. Preserving give on a penis consents with greatest, that in try to supports in properly classifying stricture dimension of this section (Wu S., 2011).

At the stage of the, a flared in was detected, tracked by a rapid tapered to the stage of the. Frequently pacification of Cowper’s penile may be gotten there, particularly if here is obstacle distal to the initial of these configures in the proximal. In particular cases, to compare between the frontal leaf of the bulbospongious strength (musculus compressor nuda) can be realized in the actual proximal. This was a standard result that would not be incorrect for a criticism (Sun D., 2014).

The opacities as a slim wisp of difference to the stage of the top of the, that may be recognized in the verumontanum performing as a separate filling fault. The standard, capable posterior urethra will be ended at balance of RUG and period like as distension of these urethral section is not shown (Feng C., 2013).

The compassion and sympathy of RUG to the analysis of a have been informed in many researches. Compassions among 73 % and 99 % had been experiential, with sympathy of 70 – 96 %. Classically, picturing is associated to and dimensions as a contrast (Sharma, 2013). Optimistic prognostic values had been described from 55 – 92 %, by negative prognostic rates variable in the 73 – 100 % rate. For Example, is measured to be great in its facility to diagnose stricture, and additional describe its distance, position, and amount with a great grade of precision. Figure 3 proves the correct description of an extended section penile urethral associated with that it was primarily measured as a “*” (Sharma V., 2011). The long section (6 cm) idiopathic was established on figure 4.

**Figure 3 A Penile urethral stricture**

**Figure 4 A Idiopathic bulbar urethral stricture.**

**Ultrasound**

McAninch (1988) were first defined Urethral ultrasound, or in another meaning sonourethrography (SU). SU is applied chiefly as the adjunctive performance in the assessment of infection with the chief benefit creature an improved valuation of related (Latini J.M., 2014). For frontal strictures 4 - 6 cm in dimension, SU has been revealed to has compassion and sympathies of 65 – 99 % and 96 – 97.5 %, with consistent positive and negative prognostic rates of 51 – 85 % and 95 – 97.5 %, separately (Sharma A.K., 2013).

The advantages of SU contain a (3D) anatomic valuation of distance and position. SU was significantly...
extra sympathetic in recognizing urethra as different to the. Additional problems contain operative dependence and a semi aggressive class, and the condition of typical or universal for complete to increase imagining (Andrich D.E., 2012).11

Problem Statement

General, SU rests a valuable assistant for the valuation of urethral stricture infection chiefly related spongiofibrosis, and can assist an extra task as an intraoperative valuation tool. Respecting the huge occurrence of urethral stricture and the requirement of using precise, easy, inexpensive and suitable approaches, the report was aimed to make comparative among ultrasound finding and retrograde urethrography to assess uretheral stricture

Methodology

The test evaluation at showed in the imaging division of Hilla Teaching Hospital in Babylon (Iraq) from Dec, 2017 to Oct, 2018. The vital administrative preparations and received the necessary licenses, all of the sufferers capable for our investigation have been made completely privy to the method, and objectives of this report after which their formal and knowledgeable agreement was received to contribute in our report. Then extra information lick as age, the length of the signs and other scientific backgrounds consisting of trauma, contamination or congenital disorders was recorded. The patients involved the ones supposed of urethral stricture that had resorted to the center to be analyzed through RUG. At the similar time, the sufferers additionally underwent Sonourethrography. To direct use the RUG, a sterilized Foley catheter become driven 3 to 4 centimeter inner their urethra, after which meglumine contrast solid was injected internal their urethra and graphic radiology become occupied within the indirect location in order to analyses stricture, location of the stricture and its period. Sonourethrography become also performed. For this reason, the ends of the syringe without a needle become injected into the urethra to insert regular saline. Once the urethras have been packed with regular saline, the urethral production was pushed for you to block the liquid from smooth out. Then, using the external probe at the ventral surface of the genital up to the perineum place, the entire urethra turned into tested by sonography to decide the actuality or absence of stricture, location of the stricture and its dimension length. Sonourethrography was showed in the sonography unit of Hilla Teaching Hospital in Babylon (Iraq) with use of Voluson 730 pro appliance thru its floor probe by a rate of 5 to 11 MHz. The consequences of each method had been as compared in opposition to each other. RUG strategies were set because the standard for this assessment and the effects of Sonourethrography have been compared with it.

The suitable technique was used for sampler, and all of the patients capable for the investigation submitted the take a look at in order to finish the volume of sample.

Contemplating, the common sonography compassion established at the report of Akano (92 %), the error of the primary kind was set to 0.05, and the precision were set to 0.05 of the investigation sample (containing 95 humans).

The investigation populace covered all of the sufferers suspected of frontal urethra stricture primarily established on the clinical signs and symptoms who were presented from the urology unit for imaging.

The presence standards permissible were simply for male patients only with frontal urethral stricture to be an applicant for imaging to analyses stricture.

The elimination criteria comprised the unfeasibility of carrying out any RUG techniques or Sonourethrography.

The average, mean and standard deviation were present in variables established; whilst frequency and ratio have been decided on to represent qualitative variables. Compassion, specialty, high quality predictive rate and negative prophetic value had been used to decide the analytical rate of Sonourethrography to RUG. The arrangement stage among RUG and Sonourethrography was determined using Kappa check. The records were then analyzed by the use of SPSS version 14.

Results

The current study was showed to make comparative among ultrasound finding and retrograde urethrography to assess urethral stricture where 95 patients were examined. The mean age of the contributors was 45.84 ± 12.5, and they all vary between from 20 to 85 years old as shown in figure 5.

The totals of 33 patients (34.7%) were analyzed with urethra stricture by RUG as shown in figure 5.
The totals of 35 patients (36.8 %) were analyzed with urethra stricture by Sonourethrography (SUG) as shown in figure 6.

Agreeing with the outcomes of RUG, 22 patients (66.7 %) were ill with local stricture, and 11 (33.3 %) was analyzed for distributed stricture. In Sonourethrography (SUG) imaging, 16 (48.5 %) were analyzed for local stricture, and 17 (51.5 %) was analyzed for distributed stricture.

The mean dimension of the urethra calculated in RUG technique was 11.84 ± 7.18 millimeter, and the mean dimension of urethra stricture calculated in Sonourethrography technique was 7.15 ± 6.28 mm. The dimension of the stricture calculated by RUG technique was meaningfully lengthier than the stricture evaluated by Sonourethrography (P = 0.025).

The outcomes completely realized by sonography survived mostly involved with the being of varied and echogenic masses external the urethra and the indiscretions of the internal partition of the urethra. Contemplating the Standard and possession in awareness the RUG as a technique to examine the urethra stricture by a vision of the outcomes of sonography, these were 19 % true positives, 71 % correct negatives, 5 incorrect positives and 4 incorrect negative situations table 1.

Table 1 Data

<table>
<thead>
<tr>
<th>Compassion</th>
<th>86.63 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty</td>
<td>94.66 %</td>
</tr>
<tr>
<td>Positive declarative rate</td>
<td>82.6 %</td>
</tr>
<tr>
<td>Negative declarative rate</td>
<td>95.94 %</td>
</tr>
</tbody>
</table>

Amongst the 5 incorrect positive situations, 3 had dispersed stricture, and 2 were analyzed with local stricture. Amongst the 4 incorrect negative situations in Sonourethrography, 3 had dispersed stricture, and 1
were analyzed from local stricture.

**Discussion**

Complete discovery of urethral strictures is serious and formative for preoperative choices and rebuilding executive. Currently, the retrograde urethrography (RUG), as standard gold technique, is applied for analysis. The present standard is similarly employed for subtle design of urethral strictures infection in the greatest precise method. Sonourethrography (SUG) is additional influential alternate technique for 3D assessment of stricture position and arrangement, and may be a dependable intraoperative appropriate expedient; however, it is joined with selected boundaries.

While there are numerous investigation regarding the original fruitful requests of ultrasonography in examination and analyzing the frontal urethra stricture amongst males and these techniques were totally harmless and bearable and simply reasonable, it had not regularly involved the consideration of the urologists at least in Iraq. The current investigation pursues to make comparative among ultrasound finding and retrograde urethrography to assess urethral stricture. This investigation analyzed 95 patients doubtful of urethra stricture by the mean age of 46, and they all varied between 20 to 85 years old.

Additional to defecating the opposing results of X ray on gonads, sonography may be simply enlarged to the bladder and kidneys and exposes the associated diseases.

Maciajawsi and others in 2016 were observing the unusual methods in the analysis the urethral stricture infection and described that the RUG has 80 to 99 % sensitivity and 81 to 98 % specificity. The researchers were described that too the RUGs have a Positive predictive rate (PPR) in the scope of 55 to 94%, on other hand the negative predictive rate (NPR) range were from 80 to 98 % (Maciajawi, 2015). They informed reported that the SUGs have 71 to 98% sensitivity and 95 to 100% specificity. The study of Peskar in 2008, was observing that the correctness of sonography associated to urethrography in analyzing urethra stricture were 95% (Peskar DB, 2008).

In this study, the compassion and specialty of ultrasound to analyzing strictures were 86% and 94% correspondingly with the assessment of its negative projection being extra than the rate of positive projection.

**Conclusion**

Finally, the outcomes completely realized over ultrasound were frequently apprehensive by the actuality of varied and echogenic masses external the urethra and the irregularities of the internal wall of the urethra. The effects of the present studies showed that the length of the stricture measure through ultrasound is shorter than the length measured through RUG. The compassion and specialty of this approach as associated to RUG in analyzing strictures turned into 86% and 94% correspondingly that are desirable stages retaining in mind its benefits. We may additionally subsequently give you the belief that urethrography is an easy plan, handy and repeatable technique that does not disclose the affected person to the ionizing radiation. To acquire greater accurate outcomes, those findings want to be in comparison to the outcomes of surgeries so that we will exactly choose which approach is more correct.

**Ethical Clearance**- Taken from University of Babylon ethics committee

**Source of Funding**- Self

**Conflict of Interest** - None

**References**

The Experience of Married Men Who Have Sex with Female Sex Workers (FSW)

Ainun Sajidah¹, Evy Marlinda¹, Agus Rachmadi¹

¹Department of Nursing, Health Polytechnic of Health Ministry Banjarmasin, Indonesia

Abstract

Background: Sexual disharmony has serious effect, such as having sex with sex workers. This study aimed to explore the factors affecting married men who have sex with female sex workers as well as consequences.

Method: This study used a qualitative design with a phenomenological approach and purposive sampling. Total Sample was 13 married men who had sex with female sex workers in Pembatuan Area Landasan Ulin Timur, Banjarbaru. We conducted in-depth interview and FGD (focus group discussion). The result of study was descriptive analysis includes data reduction, data display, conclusion, and verification. The main outcome measures were themes identified as the reason married men had sex with female sex workers and the consequences of their behavior.

Results: Factors that affecting married men had sex with female sex workers was grouped into some categories that were irritable wife, body’s wife is not ideal, wife is menopause or sick, environmental factors (intervene parents-in-laws), new sensations, loneliness because of distance, female sex workers are more communicative and romantic, get a bonus, excessive sex libido, not satisfied with his wife, the effect of alcohol and friends. While the consequences of married men had sex with female sex workers were financial disrupted, sexual transmitted infections, polygamy, better serving from wife, wife’s appearance better than usual, divorce, regret, anxious, and satisfaction.

Discussion: Married couples are expected to live in the same place to fulfill psychological and biological needs can be fulfilled. If they have to live separately, both of them can control themselves and understand the consequences.

Keyword: married men, sexual activity, female sex workers, qualitative study, FGD

Introduction

Sex as harmonious communication does not occur in every couple (¹). Harmonious sex is needed to make partner feel satisfied. Some married couple can express their affection. Recognition of sexual desire could be a positive trigger and induce positive sexual expression (²)

Otherwise, disharmony sex has serious effect, such as having sex with sex workers. Wrong sex behavior among married men was having sex with female sex worker to look for satisfied at prostitution place or tourist area (¹).

High number sexual transmitted diseases among men and women were reported and recorded in the Provincial Health Agency (Dinkes). Data from the Indonesian Ministry of Health (2016) showed that South Kalimantan had 144 people suffering from HIV, 65 people with AIDS in 2010. While in 2012 showed HIV was 34 people, AIDS was 22 people and Sexual

Corresponding author:
Ainun Sajidah
E-mail: ainunsajidah@gmail.com
transmitted diseases were 141 people. In Banjarmasin, the number of sexual transmitted disease increased in 2011 \(^5\). Based on the description, the aims of this study were to explore the experiences and consequences of married men who have sex with female sex workers.

**Method**

We used qualitative design to explore the experience of married men who have sex with female sex workers. The design of this study is qualitative research with a phenomenological approach. We conducted in-depth interview and FGD (focus group discussion) to explore ideas, health behaviors related to the experience of having sex with female sex workers.

Data were collected from married men who had sex with female sex workers at Pembatuan, Landasan Ulin, South Kalimantan from May to July 2018. We used purposive sampling with inclusion criteria were married men who had sex with female sex worker and provide the informed consent. Recruited continued until saturation data was achieved (n= 10).

We conducted forum group discussion and conducted triangulation through in-depth interviews among 3 participants to ensure reliability data. All interviews were transcribed by first author and translated into English. We used thematic analysis; the reason married men had sex with female sex workers and the consequences of their behavior. Analyzed data include data reduction, presentation, conclusions and verification.

**Results**

The results based on Focus Group Discussion method, Theme 1: factor effecting of married men had sex with female sex workers:

**Irritability**

“If I am at house, my wife always cranky, so I look for another woman” (P.1)

“If I am at house, my wife always cranky, and I do not know the problem, perhaps from my children, or from family in Java, and she is angry all the time” (P.2)

“I want to have sex with my wife, but she does not want to do it. Unfortunately, she refused while angry, and it was Ordinary” (P.4)

**Loneliness due to long-distance marriage**

Most of the reasons were the wife is not at house

“"I asked my wife to go home, but she refused it. So I look for another one” (P.3)

“It depends on my workplace”… (P.5)

“My wife in Java Island, so I want to have sex with others in here” (P.6)

“According to me, I feel loneliness” (P.9)

Wife’s body is not ideal

“My wife is thin; I want someone with a fat body (P.1)

Environment (intervene parents-in-laws)

Parents in-laws interfere, and they asked my wife to come back to their house, so it triggers me(P.7)

Variety in sex

“Eemm, I think, I only want to look for new variety in sex” (P.8)

“There is new woman, I think she is Hollywood actress,” (P.1).

“At that moment, there is good film actress, so I try it” (P.5)

Wife is menopause

“I already old as well as my wife, she often refuses to have sex with me” (P.10)

Female sex workers are communicative

“For us, the reason was I feel so comforable with female sex worker, we can share each other’s, and can communicate well” (P.2)

“Being my friend, and sharing” (P.6)

Female sex workers are romantic

“I always look for romantic one, and click with me, I always look for someone who romantic” (P.10)

Getting Bonus or additional income

“I have money… “ (P.4)(P.6)

“I got bonus” (P.1)

Peer influence

“Initial, my friend invited me to join, currently I am addicted” (P.8)

Fight with wife

“I have problems and argue with my wife….” (P.2)

“I always argue and fight with my wife because of the smell of girl perfume” (P.6)

“If my wife knew about my behavior, we will fight each other” (P.4)
“I will argue and fight, if my wife knew” (P3)

Wife is sick
“My wife is sick” (P.6)(P.5)

Theme 2: The consequence due to having sex with female sex workers
Financial disrupted
“Financial problem” (P.5)(P.4)
“Money runs out, cannot give money to the wife” (P.8)

Fight and argue
“It seems like…..I was scolded by my wife” (P.9)
“…throw the cellphone each other’s” (P.3)
“Oooo….there’s no divorce problem… If argue each others are….. usual…not often but sometimes…
sometimes when my wife knew if I have sex with other” (P.1)

“Only get angry” (P.4)

Sexual transmitted diseases
“The effect is...positive and negative are the first effect... disease is certain.....” (P.5)
“If sexual disease, emm I admit it, I’ve suffered before”. (P.8)

Polygamy
“Already found out, she already knew so polygamy” (P.5)

Wife gives better services
“My wife serves me better” (P.5)
“My wife always gives me.....I mean she never refused me to have sex” (P.4)
“Yes....she always agrees, to serve us”…. (P.2)

Wife’s appearance is better than usual
“Perfume…” (P.5)

“Her smile like onion, I already came to my house” (P.5)

Divorce
“Divorce with my wife, she already leaved me and did not live with me” (P.7)

Afraid and anxious
“I worry about HIV....but I use condom” (P.10)

Discussion
Theme 1: Factors affecting married men had sex with female sex workers

Based on the results there were 15 factors of married men had sex with female sex workers, that were 3 participants (23.1%) due to their wives are irritability. The wives often refuse when invited to have sex. It was similar to this reason, there was one participant (7.7%) said his libido is increase but his wife did not serve him. Previous study mentioned that having sex with others because their partner loses his passion for intercourse. One participant (7.7%) said his behavior due to his wife is already menopause. During menopause a woman often experiences complaints in intercourse due to loss of libido. Another reason comes from wife; there was one participant (7.7%) who had sex with female sex workers because the wife’s body is not ideal. Perception of body size related to quality life. The wrong perception of body size as the reason someone is interested in another. There were three participants (23.1%) said that they often quarreled with their wives so they rarely engage in sexual activity. Conflicts with wife is the most common reasons for married men to have sex with female sex workers. There were 2 participants (15.4%) who had sex with the female sex workers because their wives are sick, so the wife could not serve their husband. Physical or psychological disorders can cause sexual dysfunction. There was one participant (7.7%) said because of dissatisfaction in sexual activity with his wife. Feeling satisfied in sexual activity is needed between husband and wife and it relates with quality of marriages.

Other reasons come from female sex workers, there were 2 participants (15.4%) said that they want to look for variety in sex. Variety and sensation in sex is part of human need. There were 5 (28.5%) participants said that female sex workers are more communicative when invited to talk. Otherwise, their wives are lacked communication with them, so it encouraged them to have sex with female sex workers. Personal communication between husband and wife is needed to create harmonious life. There was one participant (7.7%) said because female sex workers is more romantic. One of the psychological reasons for someone having an affair is affection need.

Other reasons were from environments, there were five participants who had sex with female sex workers due to loneliness. They are doing long distance marriage or due to workplace. Need deprivation will encourage people to fulfill this deprivation with everything.
There was one participant (7.7%) said that the reason was because of parents-in-laws who interfered in their household life. Sometimes, the existence of a family could become problem in the household (13). There were 5 participants (38.5%) said they have sex with female sex workers because he got extra income. Socio-economic facilities this behavior, and trigger married men having sex with female sex workers (14).

There was one participant (7.7%) said his behavior because of alcohol influence. People who consume alcohol are more likely to engage in sex with female sex workers (15) (Schenus et al., 2006). There were two participants (15.4%) who had sex with female sex workers due to friend’s invitation. Peer influences make married men tend to use peer norms and ignore social norms (16).

Theme 2: The consequence due to having sex with female sex workers

There were five participants (38.5%) said they had financial problems because they addicted to having sex with female sex workers. There were four participants (31%) said the consequence was quarrel with wife. The biggest disappointment experienced by a wife whose husband had an affair (17). In this study found one participant (7.7%) who said he divorce due to his behavior. Sexual outside can lead to divorce (18).

Two participants (15.4%) said they suffered sexual transmitted disease or syphilis. The result also showed that four participants (31%) said they feel anxious because never use condom when having sex with female sex workers. Female sex workers believe that pill contraception not only protects the risk of pregnancy but also from sexually transmitted disease (19). One participant (7.7%) said that the consequence was polygamy. This finding is similar with previous study (20). Also, three participants (23.1%) said that it brings a positive impact, the wife provided better service to husband. She maintains the relationship and forgives her husband (21). In this study found one participant (7.7%) said that the appearance of the wife better than usual. There were 3 participants (23.1%) said they remembered their wives when having sex with female sex workers. Someone who has sex with female sex workers can get orgasm, but they do not feel satisfied (4). This study has some limitation, we used qualitative study and purposive sampling, so it could not be generalized, but the diversity of socio-economic characteristic respondents were available, such as age, background, living with partner or long distance marriage, and having menopause partner. Better understanding about these factors and consequences can educate married couple to gain harmonious life.

Conclusion

Factors that affecting married men had sex with female sex workers was grouped into some categories that were wife factors, environmental factors (intervene parents-in-laws, long distance marriage), the effect of alcohol and friends, female sex workers factors, married men factors such as not satisfied with his wife,. While the consequences of married men had sex with female sex workers were financial disrupted, sexual transmitted infections, , better serving from wife, divorce, anxious, and sexual satisfaction.

Ethical Clearance: All procedure of this study was granted IRB from Health Research Ethics Committee, Poltekkes Kemenkes Banjarmasin (Health Polytechnic, Ministry of Health, Banjarmasin, Indonesia) number: 251/KEPK-PKB/2018.

Source of Funding: Research funding was supported by Poltekkes Kemenkes Banjarmasin (Health Polytechnic, Ministry of Health, Banjarmasin, Indonesia) year 2018.

Conflict of Interest: There is no potential conflict in this article.

References


17. Rahmawati L. Problems with husband’s infidelity and its handling efforts according to Julia Hartley Moore and Mohamad Surya (BKI function perspective): UIN Walisongo; 2015.


Seroprevalence of HBV, HCV, and HIV among Blood Donors in Main Blood Bank in Najaf Province, Iraq

Rana Talib Al-Nafakh1, Shaymaa Abdul Iteef Al-Fadhul1, Hashim Ali Abdulameer Al-Sherees1, Alaa H. Al-Charrakh2

1Dept. of Medical Microbiology/ Faculty of Medicine / University of Kufa, Najaf, Iraq, 2Dept. of Microbiology/ College of Medicine / University of Babylon, Hilla, Iraq

Abstract

Objective: This study was carried out to evaluate the prevalence of HBV, HCV, and HIV among blood donors, and to identify some features of seropositive blood donors in the Main blood bank in Najaf province, Iraq.

Method: This cross-sectional study was carried out among blood donors. Data were collected from the records of the Main blood bank. Screening of all blood donors was done for the detection of hepatitis B surface antigen (HBsAg), hepatitis C virus antibody (anti-HCV), and HIV antibody by ELISA test.

Results: From a total of 35669 blood donors who attended Main blood bank during 2017-2018, 1305 were seropositive. The prevalence of HBV, HCV and HIV infection among blood donors were 3%, 0.5%, and 0.06% respectively. Most of the seropositive donors were HBV positive 1101, (84.3%), 181 (13.9%) were HCV positive, and only 23 (1.8%) were HIV positive. The majority of them were male (98.5%), they lived mostly in urban areas (80.2%). The highest rates of viral hepatitis and HIV occurred in age groups (30-39) and (40-49) years which were 39.3% and 26.7%, respectively. More than one third (38.4%) of seropositive donors of blood group O, and most of them (86.6%) were of an Rh-positive phenotype.

Conclusion: The current study demonstrated serious challenges regarding the HBV, HCV and HIV prevalence in Najaf Province. Results of the present research will be helpful for the better control and management of viral hepatitis and Human immunodeficiency virus among blood donors.

Keywords: Hepatitis B, Hepatitis C, HIV, Prevalence, Blood donors.

Introduction

Viral hepatitis B and C are major health problems, affecting 325 million people worldwide. Hepatitis B and C are chronic infections that may be asymptomatic for years or decades. They are main causes of liver cancer, leading to 1.34 million deaths every year. At least 60% of liver cancer cases are due to late testing and treatment of viral hepatitis B and C. The most important gap to be addressed is low coverage of testing and treatment in order to achieve the global elimination goals by 2030 (1). The World Health Organization (WHO) has stated that viral hepatitis could be eliminated as a public health threat by 2030. Currently, the global burden of HCV is estimated at 71 million people (2,3). Key recommendations in the WHO elimination goals are to reduce new infections by 90% and HCV-related liver mortality by 65% (3).

Liver disease due to hepatitis virus is a major public health concern that affecting millions of people globally (4). A unique group of hepatitis A, B, C, and E viruses are responsible for liver disease. All these viruses are lead to significant morbidity and mortality in developing and developed countries. The clinical manifestation of viral hepatitis varied from subclinical to life-threatening infection (5).
HBV is mainly transmitted by blood transfusions, risky sexual behaviors, tattooing, occupational hazards, unsafe injection practices, and mother-to-child in the perinatal period. HCV is mainly acquired through blood transfusions, use of unsafe injections by drug addicts or in health care centers. Mother to child transmission, and sexual transmission and are infrequent (6).

HBV is one of the most common causes of chronic liver disease which progress to chronic hepatitis. While HCV is the major source of post-transfusion hepatitis, which can result in chronic infections, cirrhosis and hepatocellular carcinoma (7,8).

HIV has killed 39 million people up to now and infected 70 million people, it is one of the worst pandemics in human history. HIV has high risk of transmission through blood transfusion, therefore; according to the instruction of WHO, screening of blood products for viral infections is mandatory. The prevalence of HIV among blood donors differs between regions and countries depending on different criteria such as the prevalence of HIV, public education regarding blood donation, the pre-donation screening, and the selection of donors.

Therefore; this research aimed to determine the prevalence and the possible risk factors for HBV, HCV and HIV among blood donors in Najaf Province, Iraq.

Materials and Method

Study design

This is a retrospective cross-sectional observational study of blood donors who donated blood in the Main blood bank-Najaf, during the period 2017-2018. A total of 35669 blood donors were included in this study. From them, 1305 were found positive for viral hepatitis or HIV. Data were collected from the records of the Main blood bank, including age, sex, residency, blood group, rhesus factor, and date of registry.

All blood donor samples were screened for the presence of HBsAg, total anti-HBc and HIV Antibody by ELISA (BioMérieux, France). For confirmation of diagnosis, positive samples were retested using the PCR.

Statistical analysis

Chi-square test ($\chi^2$-test) was used for testing of significant association between different variables. Statistical significance was considered if p-value equal or less than 0.05.

Results

Out of 35669 blood donors screened for HBV, HCV, and HIV infections, 1305 were seropositive. The prevalence of HBV infection was 3 %, HCV infection was 0.5 %, and HIV infection was 0.06%. Most of the seropositive donors were HBV positive (84.3%), 13.9% were HCV positive, and only 23 were HIV positive (1.8%). The majority of them were male (98.5%), they lived mostly in urban areas (80.2%). The age of the donors ranged from 20 to 69 years. The highest percentage of viral hepatitis found in age groups (30-39) and (40-49) years which were 39.3%, 26.7%, respectively. More than one third (38.4%) of seropositive donors of blood group O, and most of them (86.6%) of Rh-positive phenotype (Table 1).

Analysis of different variables, including gender, age, residence, blood groups, and Rh-phenotype in the association of HBV in comparison with HCV and HIV among seropositive blood donors demonstrated no statistically significant differences (Table 2).

(Table 1): Clinical and demographic features of seropositive blood donors (N=1305).

<table>
<thead>
<tr>
<th>Features</th>
<th>Features</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Virology</td>
<td>HBV</td>
<td>1101</td>
<td>84.3</td>
</tr>
<tr>
<td></td>
<td>HCV</td>
<td>181</td>
<td>13.9</td>
</tr>
<tr>
<td></td>
<td>HIV</td>
<td>23</td>
<td>1.8</td>
</tr>
<tr>
<td>2. Gender</td>
<td>Male</td>
<td>1286</td>
<td>98.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>19</td>
<td>1.5</td>
</tr>
<tr>
<td>3. Age groups</td>
<td>(20-29)</td>
<td>160</td>
<td>12.3</td>
</tr>
<tr>
<td></td>
<td>(30-39)</td>
<td>513</td>
<td>39.3</td>
</tr>
<tr>
<td></td>
<td>(40-49)</td>
<td>348</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>(50-59)</td>
<td>203</td>
<td>15.5</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td>81</td>
<td>6.2</td>
</tr>
<tr>
<td>4. Residency</td>
<td>Urban</td>
<td>1046</td>
<td>80.2</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>259</td>
<td>19.8</td>
</tr>
<tr>
<td>5. Blood group</td>
<td>A</td>
<td>399</td>
<td>30.6</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>270</td>
<td>20.7</td>
</tr>
<tr>
<td></td>
<td>AB</td>
<td>135</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>O</td>
<td>501</td>
<td>38.4</td>
</tr>
<tr>
<td>6. Rh Phenotype</td>
<td>Rh+</td>
<td>1130</td>
<td>86.6</td>
</tr>
<tr>
<td></td>
<td>Rh-</td>
<td>175</td>
<td>13.4</td>
</tr>
</tbody>
</table>
(Table 2): Comparison among HBV, HCV and HIV seropositive donors, according to gender, age, residence, blood group, and Rh phenotype.

<table>
<thead>
<tr>
<th>Features</th>
<th>HBV N (%)</th>
<th>HCV N (%)</th>
<th>HIV N (%)</th>
<th>P value</th>
<th>χ2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1083 (98.4%)</td>
<td>180 (99.4%)</td>
<td>23 (100%)</td>
<td>P=0.45</td>
<td>(χ2=1.62)</td>
</tr>
<tr>
<td>Female</td>
<td>18 (1.6%)</td>
<td>1 (0.6%)</td>
<td>0 (0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(20-29)</td>
<td>136 (12.3%)</td>
<td>20 (11%)</td>
<td>4 (17.4%)</td>
<td>P=0.52</td>
<td>(χ2=7.12)</td>
</tr>
<tr>
<td>(30-39)</td>
<td>419 (38%)</td>
<td>86 (47.5%)</td>
<td>8 (34.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(40-49)</td>
<td>299 (27.2%)</td>
<td>43 (23.8%)</td>
<td>6 (26.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(50-59)</td>
<td>178 (16.2%)</td>
<td>22 (12.2%)</td>
<td>3 (13%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;60</td>
<td>69 (6.3%)</td>
<td>10 (5.5%)</td>
<td>2 (8.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>888 (80.7%)</td>
<td>139 (76.8%)</td>
<td>19 (82.6%)</td>
<td>P=0.46</td>
<td>(χ2=1.54)</td>
</tr>
<tr>
<td>Rural</td>
<td>213 (19.3%)</td>
<td>42 (23.2%)</td>
<td>4 (17.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>340 (30.9%)</td>
<td>53 (29.3%)</td>
<td>6 (26.1%)</td>
<td>P=0.39</td>
<td>(χ2=6.27)</td>
</tr>
<tr>
<td>B</td>
<td>217 (19.7%)</td>
<td>49 (27.1%)</td>
<td>4 (17.4%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB</td>
<td>113 (10.3%)</td>
<td>19 (10.5%)</td>
<td>3 (13%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O</td>
<td>431 (39.1%)</td>
<td>60 (33.1%)</td>
<td>10 (43.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rh Phenotype</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rh+</td>
<td>953 (86.6%)</td>
<td>158 (87.3%)</td>
<td>19 (82.6%)</td>
<td>P=0.82</td>
<td>(χ2=0.39)</td>
</tr>
<tr>
<td>Rh-</td>
<td>148 (13.4%)</td>
<td>23 (12.7%)</td>
<td>4 (17.4%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Hepatitis B & C Virus infections are a significant global public health concern. Worldwide, the spread HBV and HCV increase at an alarming rate, this lead to a dramatic impact upon some countries such as Iraq. Globally, recent findings demonstrated that approximately 350 million persons are chronically infected with HBV, about 200 million persons are infected with HCV (9) and more than 70 million subjects have been infected with the HIV virus. In Iraq, viral hepatitis in general is an endemic disease, and all types of the known causative viruses are existing with various rates of infection (10).

Previous studies conducted in Iraq reported that the prevalence of HBV among blood donors was ranging from (1.6% - 4%) (11-15), and HCV ranged (0.2% - 0.5%) (11,12,16-19). Which was similar to our study that reported prevalence of HBV and HCV was 3% and 0.5% respectively.

Globally the prevalence of HBV and HCV among blood donors was ranging from (1.4% – 4.2%) and HCV was ranging from (0.3% - 0.57%) (20,21) respectively, which is similar to current results.

This study reported a higher rate of HBV than the HCV infection among seropositive donors, (84.3%,13.9%) respectively, which was similar to other studies conducted in different cities of Iraq (16-19,22-28) and
in other countries such as Iran (28-32). All these studies showed that the HBV infection was more common than the HCV in seropositive blood donor. Therefore, health programs must be available to inform people about the infectious environment of HBV and how it is transmitted. Since hepatitis B is a vaccine-preventable disease, it is important to motivate people, especially high-risk groups for vaccination.

Our study reported that HBV and HCV were higher among men (98.5%) than women (1.5%). This is due to the majority of blood donors were males, which might be attributed to the fact that in Iraqi society, men are more proactive and independently make decisions. This result was agreed with other studies conducted in Iraq (16, 17, 24-27) and also in other countries (32, 33).

The age distribution of seropositive donors was from 20 to above 60 years. The higher percentage in age group (30-39) and (40-49) years. This result is consistent with other researches (16, 22, 25, 30).

The current study found that HBV and HCV seropositive donors were more in urban than in rural. This is in agreement with other studies done in (16, 24, 25). This is could be due to most of the blood donors were from urban areas.

Our findings demonstrated the diversity of the distribution of blood groups and Rh Phenotype between HBV and HCV. Blood group O and Rh+ showed the higher rate of seropositive HBV and HCV. ABO blood groups have shown some association with diverse viruses (34).

Seroprevalence HBV and HCV was instituted highest in donors who have blood group O (39.1%, 33.1%) respectively, and lowest in donors who have blood group AB (10.3%, 10.5%) respectively, however, statistical analysis reported no significant association between different types of viral infection and ABO blood group and Rh+ phenotype. This finding was similar to the results obtained by previous by Al-juboury et al. (16).

HIV prevalence among blood donors in this study was 0.06%. In Iraq, the previous studies revealed no cases of HIV among blood donors (11, 15). The prevalence of HIV among seropositive blood donors was 1.8%, which agree with other studies conducted in Iran (1.6%) (29). HIV positive cases were males of urban residence 23 (100%). This finding was similar to the result of previous study in Sudan (35). This is may be due to men are more likely to acquire infection because they are more prone to risky behaviors.

The age distribution of HIV cases was from 20 to more than 60 years. The highest rate of HIV was within the age group (30-39) years. This could be explained by this age group has a higher sexual activity. Our study recorded higher cases of HIV among O Blood group (43.5%). This may be due to blood group O being a universal donor and so is easily used as a replacement donor.

One of the limitations of our study is non-availability of information about seronegative blood donors, therefore; we couldn’t assess of risk factors that could be associated with seropositive blood donors. Other important data such as risky behaviors like sexual activities, tattoo, and previous blood transfusions were not available in the records of the Main blood bank.

Conclusion

Our result reflects the high rate of hepatitis and HIV infection among blood donors in Main Blood Bank of Najaf. Seropositive blood donors are more likely to be male, urban residence, age group (30–39), (40-49) years, O blood groups, and Rh+ phenotype.

Conflicts of Interest: None of the authors have any conflicts of interest relevant to what is written.

Ethical Clearance: The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local Ethics Committee.

References


10- Mahmood AKA. Viral hepatitis is an endemic disease in Iraq. M. Sc. Thesis, College of Medicine, University of Babylon; 2008.


System Analysis of Public Health Surveillance in School-Age Children

Arief Hargono¹, Kurnia Dwi Artanti¹, Fariani Syahrul¹
¹Faculty of Public Health, Universitas Airlangga, Indonesia

Abstract

School-age children are more susceptible to disease transmission. Health efforts to control health problems are public health surveillance. School institutions have the potential to be the place for conducting surveillance for school-age children, considering that the school institution is a strategic place because its existence will facilitate the outreach of health programs to school-age children. The purpose of this study was to analyze the public health surveillance system for the development of public health surveillance in school-age children. This research was operational research with cross-sectional design. Research variables include data types, data sources, data collection methods, data analysis, health information and information dissemination. Development of a surveillance information system model using the System Development Life Cycle approach. The results of data identification were carried out on the types of data and information that could be monitored and collected by School Health Program teachers and students in schools. The data includes symptoms, immunization data, Adverse Events Following Immunization, student absenteeism and healthy behavior and risk factors for non-communicable diseases. The input entity as a data source is the school and the output entity as the recipient of information is the district/city health office and the education office. Information generated from this surveillance is to complete health program data from health services.

Keywords: model, information system, surveillance, school-age children, Indonesia

Introduction

School-age children are an important period in the growth and development of the human body. School-age children are also more susceptible to disease transmission. One health problem that is a priority for school children is an infectious disease that has the potential to become an epidemic, such as measles and diphtheria. Data from the Indonesian Health Profile in 2017 states that measles suspects occur in all provinces in Indonesia and 45% of measles events occur at the age of 5-14 years. Diphtheria incidence at the age of 5-14 years was 46%. Other health problems that have the potential to occur in children are dengue fever, typhoid, diarrhea, pneumonia and tuberculosis in children.

Various efforts were made by the government to control health problems that occurred. These efforts are reflected in health management in the National Health System which is regulated in the Republic of Indonesia Presidential Regulation Number 72 of 2012 concerning the National Health System. One form of implementation of the health effort sub-system for controlling health problems is public health surveillance. Surveillance is a systematic and continuous analysis of diseases and health problems and risk factors for health problems. The function of surveillance activities is to monitor health problems and evaluate ongoing health programs (Thacker, 2000). Through this surveillance activity, it is expected to be able to monitor disease risk factors so that health problems that occur can be identified earlier.

Health efforts are also carried out in schools through the School Health Program (SHP). The purpose of SHP
activities is to early detection of health problems of students and the availability of data and information to assess the health development of students. The SHP activity is a series of activities which include physical examination, laboratory, mental emotional deviation and physical fitness. Data collected in the SHP includes examining general conditions, measuring blood pressure and pulse, nutritional status, teeth and mouth, senses of vision and hearing, laboratory examinations, measuring physical activity and early detection of emotional irregularities.

School institutions are chosen to be the place for conducting public health surveillance for school-age children. School institutions are a strategic place because their existence will make it easier to reach health programs for school-age children. The selection of program implementation in elementary school institutions is expected to reach more children aged 6-15 years to be monitored for their health status.

Public health surveillance is expected to be able to monitor health problems while evaluating ongoing health programs for school-age children. The purpose of this study is to analyze the public health surveillance system for the development of public health surveillance in school-age children.

Method

The research is part of multi-year study for the development of an integrated model of public health surveillance information systems based on community and school. This research is operational research with cross-sectional design. Research variables include data types, data sources, data collection methods, data analysis, health information and information dissemination.

Development of surveillance information system model using the System Development Life Cycle (SDLC) approach. This approach includes system analysis, system design, system implementation, system maintenance and system monitoring and evaluation. The stages of SDLC carried out in this study is system analysis. The system analysis phase identifies the data and information needed for surveillance in school-age children at school.

The study was conducted in Surabaya City, East Java Province. The choice of research location is based on the high prevalence of health problems that occur. East Java Province is the province with the highest number of measles and diphtheria in Indonesia. The research informants came from Surabaya City Health Office and selected institutions for Public Health Center (PHC), Schools and Integrated Service Post for Mother and Child Health (Posyandu). Informants in the Surabaya City Health Office consisted of officers of the Surveillance Program, Maternal and Child Health, SHP, and Community Based Health Unit. Informants from the PHC consisted of surveillance officers, Maternal and Child Health, and the person in charge of data and information in the selected PHC. Informants from the school are teachers responsible for SHP. Informants from the Posyandu included health cadres in the working area of the selected health center.

Data collection is done by in-depth interviews, document studies and Focus Group Discussion (FGD). Document studies are carried out in the recording and reporting format used in activities related to the ongoing surveillance program at the PHC and schools which includes Maternal and Child Health Program, Immunization, Public Health Surveillance, Environmental Health, Non-Communicable Diseases (NCD) and SHP.

The results of in-depth interviews and document studies will be discussed together in the FGD to agree on the appropriate surveillance information system model. Data collected from in-depth interviews, document studies and FGDs were analyzed descriptively using content analysis.

Results

The development of a system model is a system analysis which is the decomposition of a whole system into its components with the aim to identifying expected data and information needs. The results of the identification of data needed by the system presented in Table 1 to Table 6.
Table 1. List of symptom data needed by the surveillance system

<table>
<thead>
<tr>
<th>Data group</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptom data</td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Cough</td>
</tr>
<tr>
<td></td>
<td>Rhinorrhea</td>
</tr>
<tr>
<td></td>
<td>Nausea</td>
</tr>
<tr>
<td></td>
<td>Vomiting</td>
</tr>
<tr>
<td></td>
<td>Diarrhea</td>
</tr>
<tr>
<td></td>
<td>Sore throat</td>
</tr>
<tr>
<td></td>
<td>Dizziness</td>
</tr>
<tr>
<td></td>
<td>Rash</td>
</tr>
<tr>
<td></td>
<td>Watery spots</td>
</tr>
<tr>
<td></td>
<td>Sprue</td>
</tr>
<tr>
<td></td>
<td>Jaundice</td>
</tr>
<tr>
<td></td>
<td>Eye pain</td>
</tr>
<tr>
<td></td>
<td>Red eyes</td>
</tr>
<tr>
<td></td>
<td>Paralyzed</td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
</tr>
<tr>
<td></td>
<td>Asphyxiate</td>
</tr>
<tr>
<td></td>
<td>Epistaxis</td>
</tr>
<tr>
<td></td>
<td>Ptechieae</td>
</tr>
<tr>
<td></td>
<td>Arthralgia</td>
</tr>
<tr>
<td></td>
<td>Dysmenorrhea</td>
</tr>
<tr>
<td></td>
<td>Blurred vision</td>
</tr>
<tr>
<td></td>
<td>Date of examination</td>
</tr>
<tr>
<td></td>
<td>Place</td>
</tr>
</tbody>
</table>

Table 2. List of immunization and AEFI data needed by the surveillance system

<table>
<thead>
<tr>
<th>Data group</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunization of school-age</td>
<td>Date DT</td>
</tr>
<tr>
<td>children</td>
<td>Measles Rubella</td>
</tr>
<tr>
<td></td>
<td>Date Td1</td>
</tr>
<tr>
<td></td>
<td>Date Td2</td>
</tr>
<tr>
<td></td>
<td>Date HPV1</td>
</tr>
<tr>
<td></td>
<td>Date HPV2</td>
</tr>
<tr>
<td></td>
<td>Date TT</td>
</tr>
<tr>
<td></td>
<td>Other immunizations</td>
</tr>
<tr>
<td>AEFI</td>
<td>Date</td>
</tr>
<tr>
<td></td>
<td>Reddish</td>
</tr>
<tr>
<td></td>
<td>Swelling</td>
</tr>
<tr>
<td></td>
<td>Fever</td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
</tr>
</tbody>
</table>

Table 3. List of absenteeism data needed by the surveillance system

<table>
<thead>
<tr>
<th>Data group</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student absenteeism</td>
<td>Date of absence due to illness</td>
</tr>
<tr>
<td></td>
<td>Name of disease</td>
</tr>
</tbody>
</table>

Table 4. List of healthy behavior data needed by the surveillance system

<table>
<thead>
<tr>
<th>Data group</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy behavior</td>
<td>Examination date</td>
</tr>
<tr>
<td></td>
<td>Height</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
</tr>
<tr>
<td></td>
<td>Body Mass Index</td>
</tr>
<tr>
<td></td>
<td>Wash hands with soap before meals</td>
</tr>
<tr>
<td></td>
<td>Wash hands with soap after defecation</td>
</tr>
<tr>
<td></td>
<td>Snacking habits</td>
</tr>
<tr>
<td></td>
<td>Bring pocket money</td>
</tr>
<tr>
<td></td>
<td>Nail conditions</td>
</tr>
<tr>
<td></td>
<td>Frequency of toothbrushes daily</td>
</tr>
<tr>
<td></td>
<td>Number of teeth cavities</td>
</tr>
<tr>
<td></td>
<td>Number of teeth lost</td>
</tr>
<tr>
<td></td>
<td>Number of teeth filling</td>
</tr>
<tr>
<td></td>
<td>Tartar</td>
</tr>
<tr>
<td></td>
<td>DMFT (cavities + missing teeth + teeth filled)</td>
</tr>
<tr>
<td></td>
<td>Drug</td>
</tr>
<tr>
<td></td>
<td>High risk sexual behavior</td>
</tr>
</tbody>
</table>

Table 5. List of NCD risk factors data needed by the surveillance system

<table>
<thead>
<tr>
<th>Data group</th>
<th>Type of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCD risk factor</td>
<td>Family member with NCD</td>
</tr>
<tr>
<td></td>
<td>Type of NCD in family</td>
</tr>
<tr>
<td></td>
<td>Smoking</td>
</tr>
<tr>
<td></td>
<td>Alcohol consumption</td>
</tr>
<tr>
<td></td>
<td>Physical activity</td>
</tr>
<tr>
<td></td>
<td>Consumption of fruit</td>
</tr>
<tr>
<td></td>
<td>Consumption of vegetables</td>
</tr>
<tr>
<td></td>
<td>Stress</td>
</tr>
<tr>
<td></td>
<td>Abdominal circumference</td>
</tr>
</tbody>
</table>
Result of data identification is carried out on the types of data and information that can be monitored and collected by teachers and students that involved in SHP in school. The data includes symptom data, immunization, Adverse Events Following Immunization (AEFI), student absenteeism and healthy behavior and risk factors for non-communicable diseases (NCD). School environment data is also collected by this system. The school environment data includes the existence of water sources, the availability of clean water, the existence of larvae and the cleanliness of latrines and school canteens.

Data collected by the system is carried out by students appointed as “little doctors” from SHP activities at school. The data was later confirmed by SHP teachers. Data collected is then processed to produce public health surveillance information for school-age children which includes:

Student health status data
Number of students with symptom
Number of symptom in students based on frequency and duration
Frequency and duration of student absenteeism
Sickness history of student
Trends in the incidence of symptom in students
Immunization status of students
AEFI incidence in students
Description of healthy behavior in students
Description of NCD risk factors in students

Entities involved in this system model include input entities and output entities. The input entity as a data source is the school while the output entity as the recipient of information is the district/city health office and the education office.

**Discussion**

Syndromic surveillance refers to the use of pre-diagnostic health indicators to allow timely detection and investigation of potential infectious disease outbreaks as a supplementary approach to routine public health surveillance, by enabling early identification of clusters of illness before confirmatory data are available. Syndromic surveillance can be carried out by the community, for example health cadres, teachers for surveillance at schools, caregiver at daycare centers. All component community who have involved Syndromic surveillance must be trained. It is like research in Malawi. There are Malawi’s CCM (Community Case Management) program. This program is a promising strategy for increasing coverage of sick child treatment. Although there is much room for improvement, especially in the correct assessment and treatment of suspected pneumonia and the identification and referral of sick children with danger signs. However, HSAs (Health Surveillance Assistants) provided sick child care at levels of quality similar to those provided in first-level health facilities in Malawi, and quality should improve if the Ministry of Health and partners act on the results of this assessment. Other research by training health care to found of suspected tuberculosis base on syndrome surveillance.
School-based surveillance is needed especially in diseases with the highest prevalence at school age. The disease like as Soil Transmitted Helminthiasis\(^4\), Childhood Obesity\(^5\), stunting and thinness\(^6\). School-based surveillance can be done through the School Health Unit Program or through School absenteeism.

School absenteeism is a plausible simple indicator of unusual health evidence within a community especially for age school\(^1\). The indicator such as child-reported fever, reported recent absence from school, absence from school due to illness, or teacher-summarized weekly absenteeism\(^1\).

School absenteeism can detection early warning some outbreaks. Study in China, it can identified the varicella outbreak, mumps outbreak and ILI (Influenza – Like Illness) outbreak\(^7\). Other research identified syndrome surveillance by some symptoms had found, like as Fever (body temperature higher than 37.5°C or self-disclosure of fever), Diarrhea (≥ three defecations per day), Jaundice (yellow coloration of tissues like skin or pore membrane, abnormal yellowing of tissues), Rash (abnormal changes of the skin, including pruritus and pain), Conjunctiva inflammation (reddened, swollen, and/or burning eyes), Parotid gland inflammation (swelling on the rear side of the earlobe, with fever and local ache when opening mouth or chewing) and Vomiting (and associated headache and abdominal pain)\(^8\).

Research trials have been conducted by recording school reporting through student data coming to the School Health Unit and School absenteeism. The most common complaints were colds (38.5%), cough (27.4%) and dizziness (25.8%)\(^9\). Fever is the common sign for School absenteeism. Study in Thailand found that 74% were absence due to sickness with fever\(^10\). Beside that this surveillance can showed that some student with absence due to sickness were significantly (p = 0.01) to have fever during rainy season (81.00%) than during the other seasons (winter = 62.84% and summer = 70.56%)\(^10\).

In addition to other data surveillance syndromes related to potential disease outbreaks such as immunization, healthy behavior, it possible to detect risk factors related symptoms\(^9\). Food insecurity has been shown to be a determinant of school absenteeism and attainment in Ethiopia\(^11\). Study in Indonesia said that Hepatitis A outbreak in high school at Lamongan District can be identified by the risk factors such as contact history with patients, eating habits together in same place, mutual exchange and sharing same eating utensils, the lack of hygiene habit (such as washing hands with soap for students and food handlers), lack of hand washing facilities, bad sanitation, bad food hygiene management, and inadequate clean and hygienic water source\(^12\).

The usefulness of the system would be dependent on motivation of the school director and teachers to collect and assess absenteeism data, and report to health extension workers when increases occur. No thresholds would be assigned to schools, but it would be the responsibility of the school director to determine when absenteeism becomes unusual and to alert the health extension workers\(^1\). School administrator and local teacher should be increasing awareness syndromic surveillance. It is important to could speed up the response time to signal about outbreak\(^7\).

The potential for recording reports carried out in schools can complement the health data, which has not yet been recorded. Electronic recording can make it easy to record, track and analyze system surveillance. The electronic health record is a cost-effective, promising tool for syndromic surveillance\(^5\). This system can be used as cohort recording to monitors symptoms of disease as an early detection of infectious disease and potential outbreaks in school students.

**Conclusion**

Public health surveillance at school-age children conducted in schools is expected to be able to monitor early illness in students. The data includes symptom data, immunization data, AEFI, student absenteeism, healthy behavior and NCD risk factors. The data is strategic for early detection of disease and monitoring health status in students. This surveillance implementation can be carried out by students and teachers who have implemented the School Health Program. Information generated from this surveillance was reported to the health office and the education office to complete health program data from health services.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Health Research Ethics
Committee, Faculty of Public Health, Universitas Airlangga, number 432-KEPK.

References


Dental Health Behavior in Elderly based on Demographic Characteristics

Aulia Feresia Mauline¹, Taufan Bramantoro², Retno Palupi²

¹Graduate Program of Oral and Dental Health, Faculty of Dental Medicine, Universitas Airlangga, ²Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia

Abstract

Elderly oral health is related to behavior maintenance and dental health improvement. Determinants factor of individual behavior are difficult to control because behavior is the result of various internal and external factors, therefore it is important to do a mapping of psychological factors that lead to dental health behavior to see dental health behavioral intentions in the elderly. Objective: To analyze attitudes, subjective norms, perceptions of behavioral control of dental health behavioral intentions in the elderly based on demographic characteristics. Method: This study is cross sectional study with observational analysis. Dental health behavior tendency is measured by interview method using the Theory of Planned Behavior model. Results: attitude (p = 0.000), subjective norms (p = 0.011), and perceptions of behavioral control (p = 0.000) significant towards dental health behavioral intention in the elderly . Conclusion: The more positive attitude towards oral hygiene, the stronger subjective norms and the higher the perceptions of behavioral control, the greater the intention of the elderly to perform optimal oral hygiene behavior.

Keywords: Intentions of dental health behavior, elderly, demographic characteristics, theory of planned behavior.

Introduction

The elderly population in Indonesia the age above 60 years is ranked at 108 from 196 countries around the world.¹ Generally the elderly experience a decrease in cognitive and psychomotor functions, that can affect the reaction and behavior of the elderly to be slower and less agile. Because of the decrease these two functions, the elderly will also experience changes in the psychosocial aspects related to their personality.²

Dental health behavior is a description of knowledge, attitudes, and actions related to the concept of health and oral problems and its prevention efforts. In this concept, the meaning of dental health is teeth and all of tissues in the oral cavity, including gum.³ There are several efforts that can be done in maintaining dental health, including brushing teeth⁴, regular check up to the dentist⁵, and diet⁶. Based on the study conducted by Bahar⁷, the behavior of maintaining dental and oral hygiene in the elderly was almost entirely included in the moderate category (67.74%) and there was a correlation between knowledge, attitudes and behavior towards the oral health.

Determinants factor of individual behavior are difficult to control because behavior is the result of various internal and external factors. From the various behavioral determinants, experts have formulated theories or models in the formation of behavior, one of the most frequently used and flexible models for mapping the causes of health behavior is Ajzen’s Theory of Planned Behavior. This model has a main focus on the individual’s intention to perform certain behaviors, because intention is considered to affect motivational factors that can influence behavior. ⁸ The main principle of the Theory of Planned Behavior is behavioral intention that predicts behavior itself ⁹, where intention is influenced by three determinants, namely attitudes, subjective norms, and perceptions of behavioral
control.\(^\text{10}\)  

**Materials and Method**

This type of study is cross-sectional study with observational analysis and cluster random sampling method. This study was conducted in 5 health centers (Puskesmas) in the Surabaya city in September-October 2018 with 135 subjects. The inclusion criterion of samples are elderly people aged 60-74 years and can communicate well.

The intention of dental health behavior was measured using the Theory of Planned Behavior questionnaire which consisted of 4 determinants namely attitudes, subjective norms, perceptions of behavioral control, and intentions with a total of 20 questions consisting of 5 questions in each determinant. Questions on the questionnaire related to oral hygiene behavior recommended by the American Dental Association (ADA) regarding the frequency of tooth brushing, tooth brushing time, tooth brushing pressure, duration of tooth brushing, tooth brushing methods, the usage of fluoride toothpaste, interdental cleansing, and tongue cleansing.\(^\text{11}\) Each question was scored with a semantic scale 1-6 with an assessment of 1 (disagree) and 6 (agree).

After data collection, the questionnaire was scored and evaluated and then processed using the SPSS version 16.0 program. Data were analyzed by linear regression to see the effect of attitudes, subjective norms, perceptions of behavioral control over dental health behavioral intentions in the elderly.

**Results**

**Table 1: Distribution of Attitudes, Subjective Norms, Perception of Behavior Control Based on Demographic Characteristics**

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Attitude mean±SD</th>
<th>Subjective norm mean±SD</th>
<th>Perception of behavioral control mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17.27 ± 3.519</td>
<td>14.80 ± 4.015</td>
<td>16.07 ± 3.493</td>
</tr>
<tr>
<td>Female</td>
<td>16.36 ± 2.904</td>
<td>13.90 ± 3.438</td>
<td>15.03 ± 3.245</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60-67 years</td>
<td>16.45 ± 3.061</td>
<td>13.88 ± 3.752</td>
<td>15.16 ± 3.331</td>
</tr>
<tr>
<td>68-74 years</td>
<td>16.93 ± 3.242</td>
<td>14.61 ± 3.504</td>
<td>15.66 ± 3.387</td>
</tr>
</tbody>
</table>

**Category : Intentions Dental Health Behavior**

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>2</td>
<td>1.48%</td>
</tr>
<tr>
<td>Moderate</td>
<td>75</td>
<td>55.55%</td>
</tr>
<tr>
<td>Bad</td>
<td>58</td>
<td>42.97%</td>
</tr>
<tr>
<td>Total</td>
<td>135</td>
<td>100%</td>
</tr>
</tbody>
</table>

Total respondent in this study was 135 people, consisted of 45 male (33.33%) and 90 female (66.67%). There were 76 people (56.30%) between the age 60-67 years old and 59 people (43.70%) between the age 68-74 years old. Based on Table 1 shows that based on sex, men have a higher mean than female sex in attitude determinants (17.27), subjective norms (14.80), and perceptions of behavioral control (16.07). Based on age group, elderly aged 68-74 years had a higher mean compared to elderly aged 60-67 years in attitude determinants (16.93), subjective norms (14.61), and perceptions of behavioral control (15.66).

Based on the category of dental health behavioral intention, almost half of the elderly respondents (75 elderly) have a moderate category (55.55%), there are 58 elderly people with a bad category (42.97%), and only 2 elderly people in good categories (1.48%).
Table 2: Distribution of Attitudes, Subjective Norms, Perception of Behavior Control towards Dental Health Behavioral intention of elderly

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Intentions mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17.24 ± 3.517</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>60-67 years</td>
</tr>
<tr>
<td></td>
<td>68-74 years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>0.313</td>
<td>0.000</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>0.202</td>
<td>0.011</td>
</tr>
<tr>
<td>Perception of behavior control</td>
<td>0.464</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*p < 0.05

Based on table 2 shows that attitudes are significantly influential on intention (p = 0.000) with positive coefficients (0.313) which indicates that the higher the attitude score, the dental health behavioral intention of elderly is getting better. Subjective norms have a significant effect on intention (p = 0.011) with the value of positive coefficients (0.202) which indicates that the higher the score of subjective norms, the dental health behavioral intention of elderly is getting better. Behavioral control perceptions significantly influence intention (0.000) with positive coefficients (0.464) which indicates that the higher the behavioral control perception score, the dental health behavioral intention of elderly is getting better.

Discussion

Based on the results of study conducted on 135 elderly respondents, significant influence was obtained between attitude variables (p = 0.000), subjective norms (p = 0.001), and perceptions of behavioral control (p = 0.000) on dental health behavioral intentions of elderly with positive coefficients value. This is in accordance with the study by 11-14, there is a correlation between attitudes, subjective norms, and perceptions of behavioral control over intention.

The higher of individual’s intention, the more motivated the individual to behave. Intention is influenced by an attitude which is a disposition to respond positively or negatively to a behavior, the more individuals have an evaluation that a behavior will effect positive consequences then the individual will tending to accept the behavior. Subjective norms are functions that are based on normative belief, that is beliefs about agreement or disagreement that come from people or groups that influence individuals such as parents, partners, close friends, teachers. Perception of behavioral control are individual beliefs about the presence or absence of factors that support or prevent an individual to emerge a behavior. 9,11,12,15

Intention is an indication of how hard someone wants to try and how much effort of an individual will make to carry out a behavior. 8 Many factors influence the decision making of the elderly to behave. The decision making is based on an awareness that starts from the intention so that the behavior is formed. 16

Elderly people often ignore their oral hygiene of their teeth and mouth and often complain of their toothache and mobility teeth which can lead to missing tooth. This condition can be prevented by maintaining dental and oral health by regularly brushing teeth and cleaning the gums, regulating dietary patterns by avoiding foods that contain lots of sugar, and conducting regular dental examinations to the dentist. In addition, the elderly also need to be educated about dental and oral health by health workers including promotive, preventive, curative and
The author would like to thank the Faculty of Dentistry, Airlangga University.

Conflict of Interest: The author reports no conflict of interest of this work

Source of Funding: This study is done with individual funding

Ethical Clearance: This study has received a letter of approval for ethical clearance on human subjects from the Faculty of Dentistry, Airlangga University with number 252/HRECC.FODM/IX/2018.

References
15. Gretebeck KA, Black DR, Blue CL, Glickman LT, Huston SA, Gretebeck RJ. Physical Activity


Cryoglobulin Responses and Herd Immunity Plots among Periodontitis Patients

Baha, Hamdi Hakim Al-Amiedi1, IMS Shnawa2, Zainb, M. Hameed3

1Ass.Prof., College of Dentistry, University of Babylon, Hilla, Iraq, 2Department of Biotechnology, College of Biotechnology, University of Qasim, Qisim, Babylon, Iraq, 3College of Dentistry, University of Babylon, Hilla, Iraq

Abstract

A Cryoprotein was separated from periodontitis patients sera and characterized as a cryoglobulin. The cryocrit percentages were ranged from 1-8% in patients as compared to 1-3% in controls. The cryoglobulin concentration were ranged from 90-240 mg/L with mean value of 188 mg/L as compared to 1.3-4 mg/L. Immunofixation studies have shown secondary mixed cryoglobulinemia of IgA-IgG-IgM type. The assessment of herd immunity using cryoglobulin as a probe revealed that there are three main fraction as: low, moderate and high responders. The herd immunity plats were normal and skewed respectively.

Keyword: Cryoglobulin, Cryocrit, Herd Immunity, Immunofixation

Background

As a part of an ongoing program for the assessment of secondary mixed cryoglobulinemia [2018 ICD-10 – CM diagnosis code D 89-1] in chronic infection diseases of human beings which covers tuberculosis [1], typhoid [2], Brucella [3], and tonsilitis [4]. The present work was devoted to assess the cryoglobulin responses among chronic periodontitis patients and their possible use as marker for the herd immunity as well as utility in herd immunity plots.

Material and Method

Twenty two dental diseased patients attending the college of dentistry during the period were diagnosed by the specialist dentist as chronic periodontitis [5]. These patient constitute the study group. Blood samples were drone from patient and sera were saved cryocrit study was made as in [7]. single radial immunodiffusion partigens of IgA, IgG, IgM (Behring Co.) in accordance with manufacturer instruction. Protein determinations were made by Beirut method [8]. Rheumatoid factor testing dene as [6] biometric analysis of the results were done as in [9]

Findings

1- Cryoglobulin:

The separated Cryoprotins found as ; Colloid, opaque, Crystallino or gelatinous in textures, Biuret test positive, precipitated at 4C° within 1-5 days, dissolved at 37C. and reprecipitated 4C°.

2- Cryocrit:

The cryocrit percentages were ranged from 1-8% in periodontitis patients as compared to 1-3% in normal subjects. Table1.

3- Cryoglobulin concentration :

The cryoglobulin concentration were ranged from 90-240 mg/L with the mean value of 188.1 mg/L as compared to 1.3-4 mg/L in control, Table2.

4- Immunofixation :

The single radial immunodiffusion studies for the cryoglobulin isotypes have shown that the periodontitis cryoglobulin responses were of secondary mixed types as IgG- IgM-IgA, Tables 3,4. Rheumatoid factor positive cases were of higher cryoglobulin isotype concentration than that of negative cases table 3-4.

5- Cryoglobulin response And Herd plots

When total cryoglobulin concentration were used as marker for herd immunity three fractions were evident as low, moderate and high responds the herd plots was
of skewed type.

**Table 1: The biometry of cryocrit % in chronic Radiation patients**

<table>
<thead>
<tr>
<th>Statistical feature</th>
<th>Cryocrit % value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>1</td>
</tr>
<tr>
<td>Median</td>
<td>2</td>
</tr>
<tr>
<td>Mean</td>
<td>5.86</td>
</tr>
<tr>
<td>Maximum</td>
<td>8.0</td>
</tr>
<tr>
<td>Range</td>
<td>1-8</td>
</tr>
</tbody>
</table>

**Table 2: The Biometry of cryoglobulin Concentration for the chronic periodontitis patients**

<table>
<thead>
<tr>
<th>Statistical features</th>
<th>Cryoglobulin Concentration mg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>90</td>
</tr>
<tr>
<td>Median</td>
<td>170</td>
</tr>
<tr>
<td>Mean</td>
<td>188.1</td>
</tr>
<tr>
<td>Maximum</td>
<td>240</td>
</tr>
<tr>
<td>Range</td>
<td>90-240</td>
</tr>
</tbody>
</table>

**Table 3: Immunofixation Assessment of chronic periodontitis patients**

<table>
<thead>
<tr>
<th>Cryoglobulin isotype</th>
<th>RF+ mg/L</th>
<th>RF- mg/L</th>
<th>Total Cryoglobulin mg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgM</td>
<td>19.8*</td>
<td>18.80*</td>
<td>11.1*</td>
</tr>
<tr>
<td>IgG</td>
<td>218.72</td>
<td>175.097</td>
<td>200.71</td>
</tr>
<tr>
<td>IgA</td>
<td>62.17</td>
<td>59.6</td>
<td>54.06</td>
</tr>
</tbody>
</table>

* mean value

**Table 4: The biometry of Cryoglobulin isotypes in chronic periodontitis patients**

<table>
<thead>
<tr>
<th>Features</th>
<th>IgM mg/L</th>
<th>IgG mg/L</th>
<th>IgA mg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>minimum</td>
<td>1.40</td>
<td>112.08</td>
<td>29.5</td>
</tr>
<tr>
<td>median</td>
<td>17.40</td>
<td>188.21</td>
<td>54.74</td>
</tr>
<tr>
<td>mean</td>
<td>11.11</td>
<td>200.76</td>
<td>54.06</td>
</tr>
<tr>
<td>maximum</td>
<td>28.66</td>
<td>258.26</td>
<td>83.73</td>
</tr>
</tbody>
</table>

**Fig 1: (Periodontitis herd plot using Cryocrit % as a probe)**

**Fig 2: (Herd plot using Cryoglobulin as a probe)**
Fig 4: (Periodontitis herd plot using IgG as a probe)

Fig 5: (Periodontitis herd plot using IgM as a probe)

Discussion

The separated cryoproteins from the patients sera were characterized as cryoglobulins \[7\] and the immunofixation studies were shown that these cryoglobulin responses were of secondary mixed cryoglobulinemia. The cryoglobulin responses profile was of IgM-IgG-IgA type Table 1-4 \[10\]. These findings were supported by similar results for the cryoglobulin association with tonsillitis patients \[4\]. Rheumatoid factors positive case showing higher cryoglobulin isotype concentration than that Rheumatoid factor negative cases \[10\]. The herd immunity were found to be as low, moderate and high responders.

Cryocrit herd plot was of normal distribution curve. Total cryoglobulin, IgM, IgG, and IgA herd plots were of skewed types \[11,12,13\]. Thus, secondary mixed. IgM-IgG-IgA cryoglobulin response were found in association of chronic periodontitis.

Conclusion

Secondary mixed cryoglobulinemia was found associated with periodontitis patients.

Conflict of Interest: We have no conflict of interest with any academician in any institute.

Source of Funding: It is self

Ethical Clearance: The project was formally registered. The clinical sampling was performed by the dentist of research team using noninvasive standard techniques with satisfaction of the study patients and controls.

References


3- Shnawa IMS, Jassim YA, Mixed two variant types of cryoglobulinemia associated with brucellosis patients WJRR, 2014,3(4): 1883-1889.


5- Haffajee AD.;and Socransky SS. Microbial etiological agents of destructive periodontal
12- Hallgrimsson Brain K, Variation, a central In Biology , Academic press.2011
Effect of Obesity in the Mode of Delivery

Ban Amer Mousa

MBCHB, DO; FIGOB, Department of Gynecology and Obstetrics/ Babylon collage of medicine/ University of Babylon, Hilla Republic of Iraq

Abstract

Introduction: Obesity is the most common health problem in reproductive age women. The obesity is a heterogeneous illness in which multiple factors interact to produce a state of positive energy balance, which leads to the increase in body weight. Objective: To assess the effect of obesity on the mode of delivery and infant birth weight. Material and method: A cross sectional study was conducted in the Department of OBG, Babylon Teaching hospital for Maternity and child complex from the 1st of Jun 2017 to the end of May 2018. Results: mean age of the respondents was (27.2±9.1) years. (40.4%) of the women were primigravida and (59.6%) were multigravida. (46.5%) were with normal vaginal delivery and (53.5%) delivered by cesarean section. 1108 of the infant were delivered with birth weight ≥4 kg and those who mother with morbidly obese were the main group (29.9%). The caesarean section is increased as the BMI was increased (18.6% for normal to 44.7 for morbidly obese). Birth weight ≥4 kg was increased as the BMI was increased. Conclusion: Caesarean section and infant birth weight ≥4 kg were increased as the BMI of the women were increased.

Key words: Obesity, Normal vaginal delivery, body mass index, primigravida, multigravida

Introduction

Obesity is rapidly becoming one of the major health problems in the developed world. Published estimates of obesity among adult women vary from 18 to 25 %.(1) World Health Organization defines obesity, in women not pregnant, depending on the index of body mass. This index is calculated from size and weight (Kg / m2) and is considered a value normal between 18.5 and 24.9. The overweight is defined as a BMI between 25 and 29.9, is considered obesity moderate (class I) between 30 and 34.9, severe (class II) between 35 and 39.9 and morbid (class III) greater than or equal to 40. Obesity can reduce the life expectancy of a person up to 10 years. (2)

It is also known that is associated with certain pathologies such as hypertension, heart disease, diabetes mellitus type 2, thromboembolisms, osteoarthritis, respiratory problems, dyslipidemia, psychosocial problems and certain cancers in addition to having a negative impact on reproductive health and during the gestational period of the woman. (3) The etiopathogenesis of obesity is complex and intervene by many factors that justify it. The progressive acquisition of Western lifestyles favors on the one hand, sedentary lifestyle; and the absence of interest in participating in some type of physical activity and the high number of hours spent sitting at work they are significant factors of obesity. For another side, both the intake and the composition of the diet play an important role in the pathogenesis of said disease. A high diet in fat, the frequent consumption of fast food and a decrease in the frequency between meals can be associated with an increase of weight. So, these bad dietary habits together with sedentary lifestyle are two of the main responsible increase in obesity in the past 20-30 years. (3)

Pregnancy is one of the periods of greater nutritional vulnerability, estimating an incidence of obesity from 6 to 28% in this era. Faced with a health problem in the pregnancy as emergent as this one, the objective set for this review is to determine in what way affects maternal obesity the course of delivery. Obesity is associated with a series of complications in childbirth,
such as pre-eclampsia (4, 5) or caesarean section (5, 6). As well as thrombo-embolism, congenital malformations, fetal macrosomia, maternal, fetal and neonatal death. Also premature births, hemorrhages and problems of postpartum infection are some of the many dangers that a pregnant woman with obesity runs. An excessive weight gain in the pregnant woman can lead to a delivery with complications, so the limits of this increase must be established according to the body mass index (BMI) before pregnancy. (7)

The different studies have described that the perception of motherhood and the birth of a child will be very different according to the course of pregnancy, the type of delivery and prenatal care and education. (8) When labor is long or becomes instrumental, the experience of women can be comparable to the recovery of a disease and can lead to difficulties in their ability to be emotionally linked to the child. (9)

**Weight During Pregnancy**

Pregnancy is a state of modifications Physiological causes of pregnancy and lactation and the intense growth and development of the fetus. Weight gain total currently recommended during pregnancy and according to the BMI before of pregnancy, it is suggested that it be 11 to 19 kg in twin pregnancy. Pregnant women usually win~ 1 to 2 kg in the first trimester. According the new recommended values, the normal weight women should increase ~ 0.4 kg per week in the second and third trimesters of pregnancy. Women with low weight should earn a little more (~ 0.5 kg per week) and overweight women a little less (~ 0.3 kg per week). Obese women should earn ~ 0.2 kg per week.

**Prevention**

It is recognized that prevention of obesity in women of reproductive age is very important for mother health and the health of her offspring. The interventions of weight control, including pharmacological treatment in pregnant women who are obese or overweight have not had enough impact on pregnancy outcomes and childbirth, suggesting that the focus of intervention must be in the periods preconception or postpartum. (10)

**Aim of the study:** To assess the effect of obesity on the mode of delivery and infant birth weight.

**Material and method**

A cross sectional study was conducted in the Department of Obstetrics and gynecology, Babylon Teaching hospital for Maternity and child complex for 2 years duration from the 1st of Jan 2015 to the end of Dec. 2017. All pregnant women on deliveries who agreed to participate were included and BMI of them were measured.

**Results**

13245 deliveries were included in the current study, with mean age of (27.2±9.1) years. 5357 (40.4%) of the women were primigravida and 7888(59.6%) were multigravida. The main group was in overweight in both primigravida and multigravida (table 1).

| Table 1: BMI and mode of delivery according to gravida of the respondents |
|--------------------|---|---|---|
| Variable           | Total | Primigravida | Multigravida |
|                    | No. | % | No. | % | No. | % |
| BMI group          |     |   |     |   |     |   |
| Normal (20-24.9)   | 521 | 3.9 | 284 | 5.3 | 237 | 3.0 |
| Overweight (25-29.9)| 6812| 51.4 | 2674| 49.9| 4138| 52.5|
| Obese (30-34.9)    | 4422| 33.4 | 1853| 34.6| 2569| 32.6|
| Morbidly obese ≥35 | 1490| 11.3 | 546 | 10.2| 944 | 11.9|
| Total              | 13245| 100.0 | 5357| 100.0| 7888| 100.0|
Table 2 shows that 5357 of the women were primigravida, 2488 (46.5%) were with normal vaginal delivery (NVD) and 2869 (53.5%) delivered by cesarean section. 1108 of the infant were delivered with birth weight ≥4 kg and those who mother with morbidly obese were the main group (29.9%).

For those with multigravida it has been found that normal vaginal delivery were decreased as the BMI of the women was increased (81.4% of those with normal BMI with normal vaginal delivery and this decrease to 55.3% for those with morbidly obese). And the cesarean section is increased as the BMI was increased (18.6% for normal to 44.7 for morbidly obese). Birth weight ≥4 kg was increased as the BMI was increased (Table 3).
Discussion

Many previous studies have noted higher rates of labor induction and induction failure in obese women, and therefore, extremely high rates of cesarean delivery. The results of present study support these previous findings. In fact, the rate of cesarean delivery in our study for women undergoing labor induction was (39.4%), which is in agreement to that found in Subramaniam A et al, (18) (2014).

The current study revealed that as the BMI increases from normal, there is increase in the possibility of a caesarian section for both primigravid and multigravida women. This is same that found by Lynch C et al, (1) (2008). For morbidly obese primigravid women, the caesarean section (Cs) delivery rate was 65.0% compared with 51.1% for those of normal weight. The equivalent figures for multigravid women were 44.7% for those who were morbidly obese and 18.6% for those of normal weight.

To our knowledge, this is the first study to have outlined the prevalence of obesity and its effect on the mode of delivery in Iraqi obstetric population. In this study, 51.4% of women were overweight, 33.4% were obese, and 11.3% morbidly obese, resulting in a figure of 84.8% of women being overweight or obese. These figures are actually more than that published rates by McCarthy S et al, study (2002) on obesity within the general Irish population. This prevalence of obesity is higher than that reported internationally. (20, 21)

Conclusion

Caesarean section and infant birth weight ≥4 kg were increased as the BMI of the women were increased.

The Conflict of Interest: There is no conflict of interest by the authors.

Source of Funding: Self

Ethical Clearance: was taken from the scientific committee of the Iraqi Ministry of health

References


Post- Traumatic Stress Disorder among Women with Breast Cancer in Iraq: A Preliminary Report

Aqeel S. Mahmood¹, Mushtaq T. Hashim², Eman A. Al-Kaseer³

¹Dept. of Surgery, College of Medicine, Baghdad University, ²Section of Psychiatry, Dept. of Medicine, College of Medicine, Baghdad University, ³Dept. of Community Medicine, College of Medicine, Baghdad University

Abstract

Background: Diagnostic and statistical manual versions IV AND 5 recognized cancer (life threatening disease) a traumatic event. Exposure to trauma (war or violence) might lead to post traumatic stress disorder (PTSD). Publishing on PTSD after ca breast is scarce in Iraq.

Objective: To comment on the prevalence of PTSD among females with ca breast.

Method: A total of 70 women with cancer of breast after surgery was included in the study. Iraqi version Harvard Trauma Questionnaire (HTQ) was used. It is a self-completed questionnaire.

Results: Out of the total, 81.4% were with PTSD. Women showing PTSD were significantly younger (46.5 ± 10.7 year) than those without PTSD (57.5 ± 10.7 year) (p = 0.002). Of those with PTSD, 93.6% were exposed to > 5 traumatic events during escalated violence in Iraq. The association between number of traumatic events and PTSD was significant (p = 0.001).

Conclusion: High prevalence of PTSD among women treated from ca breast. Age and exposure to traumatic events are determinant of PTSD.

Keywords: PTSD, ca breast, Iraq, trauma, violence.

Introduction

Receiving a diagnosis of breast cancer is likely an impact on mental health of patient. Women affected by breast cancer recall moment of their diagnosis and complain of a series of symptoms may appear (hyperarousal, emotional numbness, intrusive thinking with nightmares).

The diagnostic and Statistical Manual of Mental disorder (DSM) version IV recognized the possibility of diagnosis of post-traumatic stress disorder (PSTD) because of life-threatening disease.¹ In DSM -5 cancer considered a traumatic event only when it is sudden and catastrophic.² Publishing documented the prevalence of PTSD among patients with breast cancer.³⁴ PTSD was originally observed in the military context.

In Iraq, several articles documented the high prevalence of PTSD among youth ⁵, children ⁶, and formerly political prisoners ⁷. Publishing on PTSD among women affected by breast cancer is scarce, which was the impetus to carry out this work.

Materials and method

A total of 70 women with cancer of breast after surgery was participated in this study. Their age was 48.6 ± 11.7 years. They were recruited from Baghdad Teaching Hospital for the period 10th July 2014 to 15th June 2017.

Iraqi version of Harvard Trauma questionnaire (HTQ) was used to assess PTSD and exposure to trauma (physical, sexual and psychological) during wars, civil war and widespread violence.
HTQ was used in Iraq.\textsuperscript{5,7} Its reliability and validity were known. PTSD was assessed by adding the score of 45 questions and dividing by the total score of questions. A score of > 2 was considered as PTSD.\textsuperscript{5}

HTQ is a self-completed questionnaire. It was completed by the women with ca breast after surgery. All participant signed a consent after explanation of the aim and nature of the study.

Chi square was used to examine the association between PTSD (dependent variable) and exposure to trauma (independent variable). Student’s test was used to examine the difference in age between women with and without PTSD. P < 0.05 was regarded significant.

Results

Out of the total participants, 57 (81.4\%) women had PTSD.

The age of women with PTSD was 46.5 ± 10.7 years and those without PTSD was 57.5 ± 10.7 years. The difference in age was significant (t = 3.2, d.f. = 68, p = 0.002) (Table 1).

Of those with PTSD, 44 (93.6\%) women were recently exposed to ≥ 5 traumatic events during her life through the escalated violence in Iraq. The association between exposed number traumatic events and PTSD was significant ($\chi^2$ = 14.1, d.f. = 1, p = 0.001).

**Table 1: Prevalence of PTSD among patient with ca breast**

<table>
<thead>
<tr>
<th>PTSD</th>
<th>No.</th>
<th>mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>57</td>
<td>46.5</td>
<td>10.7</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>57.5</td>
<td>12.2</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>48.6</td>
<td>11.7</td>
</tr>
</tbody>
</table>

$t = 3.2, \text{d.f.} = 68, p = 0.002$

**Table 2: Distribution of PTSD in accumulated exposure to trauma**

<table>
<thead>
<tr>
<th>Exposure to trauma</th>
<th>PTSD</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>≤ 5</td>
<td>13</td>
<td>55.6</td>
<td>10</td>
</tr>
<tr>
<td>≥ 5</td>
<td>44</td>
<td>93.6</td>
<td>3</td>
</tr>
<tr>
<td>total</td>
<td>57</td>
<td>81.4</td>
<td>13</td>
</tr>
</tbody>
</table>

$\chi^2 = 14.1, \text{d.f.} = 1, p = 0.0001$

Discussion

The study revealed a high rate of PTSD (81.4\%) among women with breast cancer. It is much higher than that reported in Baghdad in 2012 (5\% at any time post cancer diagnosis with liberal criteria).\textsuperscript{8} This difference might be attributed to the differences in methodology (diagnosis of PTSD, criteria of PTSD and questionnaire used for diagnosis). The difference also might be explained by different stages of ca breast. The reported figure (5\%) is much lower than that reported in Baghdad.\textsuperscript{5-7} The reported high rates were explained by heavy exposure to traumatic events escalating widespread violence in the last decade.

The observed rate (84.1\%) is much higher than that reported in literature (0%-32.3\%).\textsuperscript{9,10} The prevalence of PTSD in breast cancer patients resulted in wide variation due to different evidence regarding its prevalence with time. Some studies attested higher prevalence of PTSD soon after diagnosis than at end of active treatment. Other outlined an increase in the prevalence at end of treatment.\textsuperscript{8} This study was carried out after surgery.

Methodological heterogeneity which is in turn lead to variability in results might be an explanation for variation in reported figures and the observed one.

Diagnostic and Statistical Manual of Mental disorders (DSM) version 4 recognized that it is possible to get PTSD because of life-threatening disease.\textsuperscript{1} In DSM-5 a medical disease such as cancer is considered a traumatic event only when it is sudden and catastrophic.\textsuperscript{8}

In Iraq, no screening program for ca breast,\textsuperscript{10} and centers in tertiary hospitals depend on self- referring women which in turn ca breast usually presented late. A delay in diagnosis might be due to the bad eroding of health system\textsuperscript{11} wars and widespread violence. Then, diagnosis with ca breast in Iraq is catastrophic which in turn is a traumatic event that is comply with DSM-5. This situation (late presentation of ca breast) might explain the high prevalence of PTSD among women with ca breast in Iraq.

The finding that PTSD was significantly higher among younger patient is in consistent with that of other studies.\textsuperscript{10}

This study showed that PTSD was significant high prevalence (93.6\%) in women exposed to ≥ 5 traumatic events.
events. It is consistent with that of other articles in Iraq.57

Several articles13,14 stressed that the ca breast might play a less role in development of PTSD. It was suggested that the role ca breast among predictors of PTSD (e.g. exposure to war, widespread violence, conflict …etc.) is augmented in development of PTSD. This opinion further provides an explanation for the high prevalence of PTSD among women treated for ca breast.

Conclusion

High prevalence of PTSD among women treated from ca breast. Age and exposure to traumatic events are determinant of PTSD.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from Ethical research committee – Ministry of Health and College of Medicine, Baghdad University

References


Molecular Diagnosis and Phylogenetic Analysis of 5.8s rDNA Gene of Cutaneous Leishmaniasis Species in Holy Karbala/Iraq

Dhamiaa Maki Hamza¹, Laith Hasan Obayes¹, Fadhil Sami Zghair²
¹Dept. of Microbiology/ College of Medicine / Karbala University, Karbala, Iraq, ²Dept. of Medical Laboratory / Babylon technical institute/Al-Furat Al-Awsat Technical University, Hilla, Iraq

Abstract

Objective: To identify Leishmania species in patients with cutaneous leishmaniasis (CL) in the Holy Karbala in Iraq from November 2017 to the end of January 2018.

Method: Among 100 patients were examined by dermatologists for CL at Al-Husseini Hospital with suspected stained slide smears of 92 patients showed positive result for Leishmania., The aspirated material was inoculated in Biphasic Medium which used for maintaining and cultivating Leishmania spp. polymerase chain reaction (PCR) protocols were used to amplify a region of the ribosomal DNA amplicon of Leishmania (5.8s rDNA gene). Sequencing of amplified products was done by Microgen company/USA through using by forward primer for 5.8s rDNA gene in sequencing reactions by Applied Bio system ABI Prism 377 DNA sequencer at Molecular biology department in Korea.

Results: Of 92 positive sample of Leishmania, 20 (21.7%) belonged to females and 72 (78.3%) belonged males. The PCR assays detected Leishmania major in all samples their ages ranged from (10-19 years) 6(6.5%), while ages ranged from (20-29 years) 11(11.9%), and ages ranged from (30-39 years) 17(18.5%) while the age (40-49) 37 (40.2%) and (50-59) 21 (22.8). The occupation in kids 3(3.2%), students 11(11.9%), soldiers 34(36.9%), workers 20 (21.7%), Employees 9 (9.8) and house wives 15(16.3%). Most of the lesions were found on the exposed areas of the body: face 25 (27.2%), hands 44(47.8%), Legs 11(12%), and ears 12(13%)

Conclusion: Cutaneous leishmaniasis with diverse clinical manifestation, is prevalent in karbala city caused by L.major and all of isolates is similar in 5.8s rDNA gene sequence closest with Iranian isolate genetically and distant for chinese isolate.

Keywords: cutaneous leishmaniasis, Leishmania major, Molecular diagnosis, phylogeny, 5.8S rDNA Gene.

Introduction

Leishmaniasis is endemic in many parts of the world and it is found in different part of Iraq (¹). Leishmania tropica and Leishmania major are, respectively, the main causative agents of anthroponotic cutaneous leishmaniasis (ACL) and zoonotic cutaneous leishmaniasis (ZCL) (²).

Definitive diagnosis of species that caused the disease is essential to select the proper and effective treatment of various forms of infection as well as control the disease in a region (³).

Direct smear method for diagnosis the disease is the traditional technique used for patients who infected with Leishmania lesions. The direct smear has less sensitivity compared with PCR molecular techniques on leishmanial diagnosis (⁴,⁵).

Many different PCR targets, including the coding and intergenic noncoding regions of the gp63 gene locus, splice leader mini-exon (SLME), the SSU rRNA gene, the ITS1 region and 5.8s rDNA have been used for the identification of parasites from cultures and for their direct detection in various animal, sand fly, and human tissues (⁶,⁷,⁸).
The aim of this study was to investigate the Molecular diagnosis of the *Leishmania* species that caused cutaneous leishmaniosis in Holy Karbala and study of sequencing of 5.8s rDNA in isolated specimens by multiple sequence alignment analysis and phylogenetic tree analysis to compare between the local isolated species and the global species recorded in NCBI.

### Materials and Method

**Samples Collection**

One hundred patients with lesions clinically suggestive of CL were evaluated in the outpatient dermatology clinic in a teaching hospital in Karbala, Iraq. The laboratory work was performed in the Department of Microbiology, College of Medicine, University of Karbala /Iraq. The study was performed between November 2017 to the end of January 2018.

After a detailed clinical and epidemiologic history had been obtained, The primary isolation was made from patients with cutaneous lesions. The puncture site (lesion) was cleaned with 70% ethanol before sample aspiration. 1 ml syringe containing 0.1-0.2 ml of sterile saline was inserted intradermal into outer border of the lesion. The syringe was rotated and the tissue fluids were gently aspirated into the needle while its withdrawal.

The aspirated material was inoculated in culture tubes containing five ml of NNN medium. All inoculated tubes were incubated at 25º C. All cultures were incubated and examined for 15-30 days before being considered negatives. Patients were positively diagnosed for CL when actively motile promastigotes were seen in culture(9).

**Molecular diagnosis by Nested PCR for 5.8s rDNA gene**

Nested PCR performed *Leishmania* spices in only 50 patients because of the difficult circumstances in Iraq. Specific primers for 5.8s rDNA gene were derived as forward (GCA GCT GGA TCA TTT TCC) and reverse (ATA TGC AGA AGA GAG GAG GC), (10).

The PCR products were analyzed by 5% agarose gel electrophoresis with 8 mL of the reaction mixture, and the bands on an ethidium bromide stained gel were visualized and photographed under UV light with a Polaroid MP4+ system.

**DNA sequencing methods**

DNA sequencing method performed for confirmative detection and Phylogenetic analysis of the local species of *Leishmania* that responsible for Cutaneous leishmaniasis based on 5.8 rDNA by Phylogenetic tree analysis using the program (MEGA 6), while the Test type was UPGMA tree (bp) PCR product of species *L. major* were purified from agarose gel and sequenced by Macrogen company/USA through using forward primer (GCT GTA GGT GAA CCT GCA GCA GCT GGA TCA TT) and reverse primer (GCG GGT AGT CCT GCC AAA CAC TCA GGT CTG). The sequencing Applied by Bio

**Results**

The current study included 92 CL patients which categorized into 72 (78.3%) males and 20 (21.7%) females. Ages ranged from 10-19 years (6.5%), ages ranged from 20-29 years (11.9%), ages ranged from 30-39 years (18.5%), age (40-49) was (40.2%), and (50-59) was (22.8%). The occupation in kids (3.2%), students (11.9%), solders (36.9%), workers (21.7%), Employees (9.8), and house wives (16.3%). Most of the lesions were found on the exposed areas of the body: face (27.2%), hands (47.8%), Legs (12%), and ears (13%).

### Table (1): Frequencies and percentages of Socio-demographical characteristics

<table>
<thead>
<tr>
<th>Socio-demographical characteristics</th>
<th>Group</th>
<th>Frequency</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>72</td>
<td>78.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>20</td>
<td>21.7</td>
</tr>
<tr>
<td>Age</td>
<td>10 - 19</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>20 - 29</td>
<td>11</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>30 - 39</td>
<td>17</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>40 - 49</td>
<td>37</td>
<td>40.2</td>
</tr>
<tr>
<td></td>
<td>50 - 59</td>
<td>21</td>
<td>22.8</td>
</tr>
<tr>
<td>Occupations</td>
<td>Kids</td>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>11</td>
<td>11.9</td>
</tr>
<tr>
<td></td>
<td>Solder</td>
<td>34</td>
<td>36.9</td>
</tr>
<tr>
<td></td>
<td>Worker</td>
<td>20</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>Employee</td>
<td>9</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>Housewives</td>
<td>15</td>
<td>16.3</td>
</tr>
</tbody>
</table>
Cont... Table (1): Frequencies and percentages of Socio-demographical characteristics

<table>
<thead>
<tr>
<th>Site of lesions</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>25</td>
<td>27.2%</td>
</tr>
<tr>
<td>Hands</td>
<td>44</td>
<td>47.8%</td>
</tr>
<tr>
<td>Legs</td>
<td>11</td>
<td>12%</td>
</tr>
<tr>
<td>Ears</td>
<td>12</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>92</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Sequence analysis of twelve positive samples of *L. major* were performed to confirm the PCR results. The Multiple sequence alignment analysis of 5.8s rDNA of *L. major* was shown in the (Fig. 5,7), while the Phylogenetic relationship tree analysis was constructed based on the twelve local samples of species *L. major* compare between them (Figure 4) and for compare with global species through MEGA 6 program used of the test from type (UPGMA tree) as shown in the (Fig.

Figure (1): Male 30 years old with typical lesion of CL on the upper limb, an ulcerated nodule lesion on the arm, well circumscribed with a necrotic base and indurate margin

Figure (2): A 5 years old child with typical lesion of CL on the face, an ulcerated nodule lesion behind the ear, well circumscribed with a necrotic base and indurate margin.

All samples showed bands, which indicated the genomic DNA on Agarose Gel Electrophoresis

The presence of the 5.8s rDNA gene was identified by 462bp as shown in Figure (3).

Figure (3): Agarose gel show the PCR product results for *L. major* of 5.8s rDNA where M: 1500bp Ladder, Lane [1-20] are 462 bp positive samples.

Figure (4): The comparison between the phylogenetic Tree analysis of Twelve local samples [K1-K12] of *L.major* with each other.

Figure (5): The multiple alignment analysis of twelve local positive samples [K1–K12] of *L. major* comparison with each other.

Figure (6): The comparison between the phylogenetic Tree analyses of twelve local samples [K1-K12] of *L. major* with global *L. major*.
Leishmaniasis is endemic in more than 80 countries. Its overall global prevalence is estimated to be around 12 million cases and this figure increases by 1.5–2 million each year. CL occurs in 82 countries and 1.5 million new cases are recorded every year (11). Migration, travel, and ecological changes contribute to this increase. Host, parasite, and vector characteristics determine the occurrence and course of the disease (12). CL is highly prevalent in our neighboring countries of Turkey, Iran, and Syria and there are massive migratory flows into Iraq from these countries, both controlled and uncontrolled (13). An outbreak has occurred with the current war against ISIS in the north of Iraq and increased the migration from this area to Middle Euphrates Region and the lack of services provided to the displaced and the poor living conditions led to the spread of cutaneous leishmaniasis among the displaced as well as spread the CL among the soldiers returning from the battlefield in the north (14).

In the current study, the frequency of male was higher than of female It could be due to more contact of men with vectors based on the type and time of their work compared with women. Although most age groups were at risk of the disease, but based on obtained results, the prevalence of CL was higher in age group 40 - 49 years old because most of them are soldiers or migrated. The effect of age might be actually influenced by disease endemcity and immune reactions of the host (15).

Traditional techniques (direct examination and culture) commonly used for diagnosing leishmaniasis do not differentiate Leishmania species and their sensitivity is also less than molecular techniques (16). It is possible that infections of Leishmania parasites will be missed due to disparate growth rates of different parasites in blood agar cultures (17). Nested PCR provides a rapid, sensitive, and specific alternative to traditional techniques (18). In the current study, Leishmania promastigotes isolated from patient samples were typed with Nested PCR and DNA sequencing using primers specific for the 5.8s rDNA. The 5.8s rDNA that were similar to those obtained with standard Leishmania strains was chosen as the target for the diagnostic PCR analysis because 5.8 of the ribosomal DNA repeat unit has previously been used to distinguish Old World Leishmania species using Nested and DNA sequencing. The sensitivity of the 5.8s rDNA analysis has been demonstrated and PCR is an efficient technique for the identification of Leishmania species.

In patients with CL, the lesions differ throughout the clinical course of the disease and in response to treatment, depending on the causative agent. In the present study, the Leishmania species isolated from samples was identified as L. major. Leishmania major is the predominant cause of CL in the Iraq.

The Phylogenetic relationship tree analysis according to (Mega 6) program from type (Test UPGMA tree) to compare between the local L. major showed a high similarity between them except the sample k2 which taken from traveler came from china.

The results of Multiple sequence alignment analysis of 5.8s rDNA gene in the PCR product of twelve samples of species L. major (K1-K12) with global strains shows great affinity with Sudan, Iran, USA, Germany and France while there is a different in the sequencing between the local strain and the China strain.

Obtained results highlight the need to find a universally accepted diagnostic tool for Leishmanial typing, that is sensitive and capable of identifying all clinically significant Leishmania species. The risk of transmitting this “flesh-eating” parasite into the Iraqi society is high. Thus, effective prevention methods and appropriate therapy is critical. Prevention can be as simple as using nets treated with insecticide or spraying insecticides to kill sand-fly vectors (19). For the differentiation of Leishmania at the sub-species level, it is recommended to perform multi-locus sequence typing (MLST) method.

Moreover, whole-genome sequencing (WGS) provides a greater potential to identify genetic component of health problems and infectious diseases (20). Accessible international databases for cases of leishmaniasis in the MENA region (Middle East and North Africa) should be created for a better epidemiological assessment of these infectious agents and for tracing their patterns of migration between countries and continents.
Conclusion

Cutaneous leishmaniasis with diverse clinical manifestation, is prevalent in Karbala city caused by *L. major* and all of isolates is similar in 5.8s rDNA gene sequence closest with Iranian isolate genetically and distant for Chinese isolate.

Conflicts of Interest: None of the authors have any conflicts of interest relevant to what is written.

Funding Source: University funding was provided for: data collection, analysis, and interpretation; trial design; patient recruitment. No public funding was received.

Acknowledgment: Authors would like to express their thanks and gratitude to Prof. Alaa H. Al-Charrakh, University of Babylon, for his critical reading of the manuscript.

Ethical Clearance: The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local Ethics Committee.

References


9- Singh S, Sivakumar R. Recent advances in the diagnosis of leishmaniasis. JPM. 2005; 55-60.


16- Shahbazi F, Shahabi S, Kazemi B, Mohebali M, Abadi AR, Zare Z. Evaluation of PCR assay


Association of Certain HLA –II/ DR Alleles with Incidence of Thyroiditis in Iraqi Patients

Samir S. Raheem1, Mussa M. Alkhatib2, Mohammed M. Alomari3

1Department of Microbiology / Collage of Veterinary Medicine – Al-Muthanna University, 2Department of Public Health / Collage of Veterinary Medicine – Al-Muthanna University, 3Department of Internal and Preventive Medicine / Collage of Veterinary Medicine – Al-Muthanna University

Abstract

Background: Endocrine epithelial cells, targets of the autoimmune response in thyroid and other organ-specific autoimmune diseases express HLA class II molecules that are presumably involved in the maintenance and regulation of the in-situ autoimmune response. Presents a clear linkage with MHC class II. Moreover, the common auto antigen in either species. A number of studies have shown that either a reduction in the number of T regs or a reduction in the suppressive abilities of the T regs may cause self-reactive T cells to remain and lead to autoimmune disease. Human autoimmune thyroid diseases (AITD), such as Hashimoto’s thyroiditis and Graves’ disease (GD), are characterized by T and B cell infiltration of the thyroid gland and an intense immune response to well-characterized thyroid auto antigens such as thyroglobulin (Tg).

Aim of the study: To identify any role for certain alleles in occurrence of the disease.

Material and Method: Five ml of venous blood samples withdrawn from 30 patients suffering from confirmed thyroiditis disease, 18 patients were females and 12 males in addition to 30 healthy control samples were enrolled in this study all samples were subjected for (ELISA test) (Enzyme Linked Immunosorbent assay) to estimate the TNF-α, and IL-10 Levels by using three ml of blood to extract the serum. Another two ml was used for DNA extraction, and then HLA-Class II genotyping was performed by polymerase chain reaction-sequence specific oligonucleotide probes (PCR-SSO).

Results: HLA-class II genotyping of thyroiditis patients in comparison with healthy control evoked significant differences in some alleles between both groups. Among DR HLA-DRB1 polymorphism determines susceptibility to autoimmune thyroiditis alleles there were some alleles showed higher frequency in patients group; DR*0403 allele showed increase frequency in patients groups with 35% compared with 6.67% in control group, and the P value was 0.020, which is considered as statistically significant. Another DR*701 allele showed increase frequency in healthy groups with 9 cases 30% and the P value was 0.007. A significant elevation in IL-4 levels and a highly significant increase in IL-10 levels was reported in Thyroiditis patients.

Keywords: Thyroiditis, Genotyping, alleles, IL-4, IL-10.

Introduction

Endocrine epithelial cells, targets of the autoimmune response in thyroid and other organ-specific autoimmune diseases, express HLA class II (HLA-II) molecules that are presumably involved in the maintenance and regulation of the in situ autoimmune response. HLA-II molecules autoimmune thyroid diseases have led to studies of their association with human major histocompatibility complex (MHC) class II genes. One such gene implicated in Hashimoto’s thyroiditis (HT) is HLA-DR3, but the association is weak and is contradicted by other reports. HLA-DRB1 polymorphism determines susceptibility to autoimmune thyroiditis and implicates

Corresponding author:
Samir Sabaa;
Department of Microbiology / Collage of Veterinary Medicine – Al-Muthanna University;
email: ssrj1964@yahoo.com
Tg as an important autoantigen. Several studies in Caucasians have implicated both DRB1*0301 (DR3) and DRB1*11011 (DR5). A negative association with DR3 or lack of any DR region association has also been reported. DRBI polymorphism is a determining factor in susceptibility to autoimmune thyroiditis.

Initially the symptoms of HT may not be apparent. As the disease progresses and hypothyroidism becomes more severe, visible symptoms may occur. Common symptoms include intolerance to cold, mild weight gain, fatigue, constipation, dry skin, hair loss, heavy and irregular menses, difficulty concentrating or thinking, joint stiffness and facial swelling. In some cases, mild thyrotoxicosis and sometimes transient elevation of free T3 and T4. Hyperthyroidism, in extreme cases myxedema (dermal and cutaneous edema caused by deposit of large amounts of mucoproteins in the tissues) leading to a coma may occur. An enlarged swelling in the neck or goiter may also be present as a result of either inflammation or hashimotoxicosis and late in the disease a small or atrophic thyroid gland. If a goiter is present it may be unilateral or bilateral and will be diffuse and firm with pyramidal lobe enlargement. Although it is clear that auto antibodies are present in HT, their exact role in the pathogenesis of the disease remains to be unclear whether the auto antibodies present are the trigger or the result of an autoimmune attack. This is due in part to the variable titers of auto antibodies detected in HT patients.

Materials and Method

Blood Samples: Five ml of venous blood were obtained from each subject, from which 2 ml were kept in EDTA tubes for DNA extraction, and the other 3 ml in plane tubes from which serum was obtained and kept at -20°C until use. The patients related to the medical city in Baghdad- orthopedic unit, during the period from February to August 2017, in addition to thirty healthy control group enrolled in this study.

DNA Extraction and Genotyping: DNA was extracted from whole blood using ready kit (KIAGEN/ Germany) according to the manufacturer’s instructions. Sequence-specific oligonucleotide primed PCR (PCR-SSO) method was used for the amplification of HLA-DRBI and HLA-DQ using ready kit (Lipa HLA DRB, Innogenetics. Murex Biotech Limited, Dartford, UK). Molecular typing of HLA alleles was performed using a reverse hybridization Automatic Line probe assay (Auto-Lipa) supplied by the same company, in which typing tests were based on the reverse dot blot hybridization. Positive probes on each strip were recognized by typing table (provided with the kit).

Serum levels of TNF-α, IL-10: Commercial kits were utilized for estimation of serum levels of IL-10, TNF-α, (Demeditec Diagnostic/ Germany) and using automated ELISA apparatus ((Diagnostic Automation Inc, USA) and following the manual protocol supplied with each kit.

Statistical Analysis: The Statistical Package for the Social sciences (SPSS, version 14) was used for statistical analysis. The association between different alleles and the development of RA was calculated through adjusted odd ratio and 95% confidence intervals using Chi-square test. Serum levels of cytokines were quantititative variables, but were non-normally distributed as shown by Shapiro-Wilk test. These variables are better to be analyzed by nonparametric test, and median but not mean was calculated. The Mann-Whitney test was used to further explore the significance of difference in median between each pair of study groups. The P value < 0.05 was considered statistically significant.

Results

Two class II HLA-DR alleles showed a significant increase in frequency; *0403 occur in 7(35.00%) patients and 2 (6.67%) in healthy control group. The significant allele was *0701 q which occur in 9 (30.00%) in healthy group compare to 0 (0.00%) in patients group.

Table 1: Differences in mean serum levels of IL-4 in Thyroiditis patients and healthy

<table>
<thead>
<tr>
<th></th>
<th>Healthy control</th>
<th>Thyroiditis patients</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum</td>
<td>0.00</td>
<td>42.00</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>0.00</td>
<td>6.44</td>
<td>0.017*</td>
</tr>
<tr>
<td>Total number</td>
<td>20</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

A significant elevation in IL-4 levels was reported in Thyroiditis patients sample compared to healthy control with P value 0.017.
Table 2: Differences in a serum levels of IL-10 in Thyroiditis patients and healthy

<table>
<thead>
<tr>
<th></th>
<th>Healthy control</th>
<th>Thyroiditis patients</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td>11.80</td>
<td>83.50</td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>0.00</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>Med</td>
<td>0.00</td>
<td>10.25</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.13</td>
<td>16.24</td>
<td>&lt;0.001**</td>
</tr>
</tbody>
</table>

A highly significant increase in IL-10 levels was reported in patients serum in comparison to healthy control and the P value was <0.001***

Discussion

An environmental causal factor such as variation in iodine levels or bacterial/viral infection may affect the thyroid causing an inflammatory response and an influx of dendritic cells and macrophages which could be the trigger to activate other immune cells resulting in an autoimmune response. This theory also links to the Selenium therapy mentioned in the discussion of the treatment of HT. A deficiency in the levels of selenium would cause a prolonged and intensified inflammatory response. This may then cause a heightened sensitivity to pathogens resulting in self antigens being recognized as non-self. Dietary intake of iodine, cigarettes, alcohol and some bacterial infection.

This is usually performed by typing each individual patient and each control for the tested marker, but recently, methods for DNA pooling have been developed, which could simplify large-scale association studies. If the allele tested is associated with the disease, it will appear significantly more frequently in patients than in controls. The probability of having the disease in an individual positive for the allele compared with an individual negative for the allele is estimated by the RR.

Conflict of Interest: This research is a personal non-profit work and there is no conflict of interest.

Source of Funding: None.

Ethical Clearance: Ethical clearance was obtained from the Faculty Scientific Committee (1Department of Microbiology /Collage of Veterinary Medicine –Al-Muthanna University) to study the association of certain HLA–II/ DR alleles with incidence of thyroiditis in Iraqi patients.

References

Factors Associated with Self-Empowerment among Patients with Diabetes Mellitus in South Kalimantan

Endang Sri Purwati Ningsih, Syamsul Firdaus
1Department of Nursing, Health Polytechnic of Health Ministry Banjarmasin, Indonesia

Abstract

Background: Self-empowering among patients with diabetes mellitus is needed to prevent complication. Self-empowering is influenced by individual factors such as gender, experience for caring diabetes mellitus and eating habit; psychological factors such as self-efficacy and coping; and health literacy such as access to health care services and provider interaction. Objective: The aim of this study was to investigate the factors associated with self-empowerment among patients with diabetes mellitus in South Kalimantan. Method: This study was observational study and used cross-sectional design. Data were collected from patients with Diabetes mellitus using cluster random sampling at 3 hospitals in South Kalimantan Province. Total sample was 250 patients and also used self-report questionnaires. We used chi-square test to measure correlation between independent variable and dependent variable and logistic regression was used to investigate the factors relate to self-empowerment among patients with diabetes mellitus, p-value ≤ 0.2 was considered to analyze the variables into logistic regression. Results: According to chi-square test results, there was significant difference existed in the frequency of eating habits, caring experience, provider interaction, and self-empowerment. Furthermore, there was no significant difference between the two groups for gender, self-efficacy, coping strategies, access to health care services and self-empowerment. In addition, logistic regression showed provider interaction (odds ratio [OR], 50.545; 95% confidence interval [CI], 8.671 to 294.651) and eating habit (OR, 5.086; CI, 1.026 to 32.079) increased self-empowerment Conclusion: Provider interaction and eating habit had significant increase on self-empowerment. Keywords: Self-empowerment, Diabetes mellitus, Health literacy, Psychological, Eating habit

Introduction

Diabetes Mellitus (DM) is described as a metabolic disease with characteristics of an increase in blood sugar levels. A person with DM experiences a high risk of developing life-threatening health problems, increasing health costs, decreasing quality of life and increasing mortality (1). The number of people with diabetes mellitus was 415, with 46.5% undiagnosed. In fact, 1 out of 11 adults have diabetes. Furthermore, it is estimated that the number of diabetics worldwide will increase. In Indonesia recorded that 29 million people had impaired glucose tolerance and will increase to 36.8 million in 2040 (2).

Based on the results of data from basic health research (RISKESDAS) (2013) showed that the population with diabetes mellitus in south Kalimantan province was 2,722,366 and only 38,113 were diagnosed with diabetes. The remainder of this population with diabetes never been diagnosed but in the last 1 month, they have symptoms such as frequent hungry, thirsty, and urination in large quantities also weight loss (3).

Patients with diabetes mellitus must have good control life style and self-management, if they have poor management, it will increase the risk of complications and morbidity (4). Complication can be a burden for patients with diabetes mellitus (5). Complications could be prevented through patient-empower. Self-empowering among patients with diabetes mellitus requires active participation from patients, families and the communities (6).
Self-management in chronic disease is needed (7). Self-management could be increased by self-empowering (8). Patient empowerment is a “paradigm shift” from traditional service providers centered on the medical model to patient-centered collaborative care (6). Self-empowering is influenced by individual factors and psychological factor (9). Individual factors such as cognitive and behavior, in addition, psychological factor was related with self-efficacy that was how confident patients to care of their selves (7). Self-empowerment also can be reached through health literacy such as access to health care and interaction of health care provider (10). Self-empowerment is needed for patients with diabetes mellitus to increase their health status (11). So the aim of this study was to investigate the factors associated with self-empowerment among patients with diabetes mellitus in south Kalimantan.

Method

Research Design

All procedure already granted by IRB from Health Polytechnic Banjarmasin number 065/KEPK/2017. This study was observational study and used cross-sectional design. The aim of this study was to analyze factor related to self-empowerment among patients with diabetes mellitus. This study examined whether the relationship between characteristic, there were gender, experience for caring family members with diabetes mellitus, knowledge in term of Diabetes mellitus, and eating behavior; psychological factors there were self-efficacy and coping strategies; health literacy, that were access to health care service and provider interaction that affecting self-empowerment (dependent variable) for patients with diabetes mellitus.

Participants and setting

The setting of this study was 3 hospitals in South Kalimantan province. Data were collected from patients with Diabetes mellitus using cluster random sampling. The inclusion criteria were age 25-65 years old, can communicate, read and write and no hearing loss. Total sample was 250.

Instruments

We used self-report questionnaires to measure all variables.

Socio-demographic respondents

We asked participants in term of age, experience for caring family members with Diabetes Mellitus, and eating behavior. In term of eating habits, we asked about diet pattern, consumption food with coconut milk, sugar, fried food, and consuming fruits and vegetables (12).

Psychological factors

Self-efficacy

We adopt self-efficacy scale Standford University to measure self-efficacy (13). It consisted of 6 items. The cronbach alpha of this questionnaire was 0.857.

Coping strategy

We developed the questionnaire from Stuart and Sundeen (1991) (14). It consisted of 10 items and had good internal consistency with The cronbach alpha was 0.779.

Health literacy

We modified from health literacy questionnaire from Osborne RH (2013) (15). It has 2 domains, Access of health care and provider interaction. It consisted of 9 items and the cronbach alpha of this factor was 0.731. Another factor was provider interaction, it consisted of 6 items The cronbach alpha of this factor was 0.822.

Self-empowerment

We adopted and modified self-empowerment questionnaire from The Diabetes Empowerment Scale-Short Form (DES-SF) (16). The final version of this questionnaire consisted of 7 items. The cronbach alpha of this questionnaire was 0.822.

Data analyses

Data were analyzed with SPSS for windows (p-value of < 0.05 was considered to describe statistically significant difference. Socio-demographic of respondents, psychological factors, and health literacy were used to categorize subjects as low self-empowerment and high self-empowerment and we used chi-square test to measure correlation between independent variable and dependent variable. Logistic Regression was used to investigate the factors relate to self-empowerment among patients with diabetes mellitus, p-value ≤ 0.2 was considered to analyze the variables. We used internal consistency to calculate cronbach alpha. Cronbach alpha > 0.5 was considered
Results

Socio-demographic and self-empowerment

In this study the respondents that complete all of questionnaire were 250 patients that were, 90 men and 160 women. Based on gender most of participants had high self-empowerment, with female higher than male. In addition, there was no significant difference between the two groups for gender and self-empowerment. In term of eating behavior, most of respondents with high self-empowerment had healthy eating behavior. There was significant difference existed in the frequency of eating habits and self-empowerment. Furthermore, there was significant difference between the two groups for caring experience and self-empowerment.

Baseline Characteristic of Study Variables

<table>
<thead>
<tr>
<th></th>
<th>Self-Empowerment</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
<td>p-value</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>N</td>
<td>%</td>
<td>%</td>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>2.2</td>
<td>0.512</td>
<td>88</td>
<td>97.8</td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>3.8</td>
<td></td>
<td>154</td>
<td>96.8</td>
</tr>
<tr>
<td>Experience for caring family members with Diabetes Mellitus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0</td>
<td>0.027</td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>5.1</td>
<td></td>
<td>149</td>
<td>94.9</td>
</tr>
<tr>
<td>Eating Habit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Health</td>
<td>4</td>
<td>9.5</td>
<td>0.011</td>
<td>38</td>
<td>90.5</td>
</tr>
<tr>
<td>Healthy</td>
<td>4</td>
<td>1.9</td>
<td></td>
<td>204</td>
<td>98.1</td>
</tr>
</tbody>
</table>

Factors associated with self-empowerment

There was significant positive correlation existed in the two groups for provider interaction. In addition there were no significant correlation existed in the two groups for self-efficacy, coping strategies, and access to health care services. We conducted logistic regression to analyze factors associated with self-empowerment, with variables that had significance level of ≤ 0.2 in the univariate analysis. Provider interaction and eating habit had significant increase in high self-empowerment.

Factors associated with self-empowerment

<table>
<thead>
<tr>
<th>Factors</th>
<th>Low</th>
<th>High</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>5.3</td>
<td>94.7</td>
</tr>
<tr>
<td>High</td>
<td>6</td>
<td>2.8</td>
<td>97.2</td>
</tr>
<tr>
<td>Coping strategies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maladaptive</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Adaptive</td>
<td>8</td>
<td>3.3</td>
<td>96.7</td>
</tr>
<tr>
<td>Health Literacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access to health care services</td>
<td></td>
<td></td>
<td>0.737</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
<td>3.2</td>
<td>96.8</td>
</tr>
<tr>
<td>Provider interaction</td>
<td></td>
<td></td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Low</td>
<td>6</td>
<td>2.4</td>
<td>5.6</td>
</tr>
<tr>
<td>High</td>
<td>2</td>
<td>0.8</td>
<td>91.2</td>
</tr>
</tbody>
</table>

Logistic regression analysis of factors associated with self-empowerment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>95% confidence interval</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower</td>
<td>Upper</td>
<td></td>
</tr>
<tr>
<td>Provider interaction</td>
<td>50.545</td>
<td>8.671</td>
<td>294.651</td>
</tr>
<tr>
<td>Eating behavior</td>
<td>5.086</td>
<td>1.026</td>
<td>32.079</td>
</tr>
</tbody>
</table>

Discussion

The aim of this study was to investigate the factors associated with self-empowerment among patients with diabetes mellitus in South Kalimantan. According to
chi-square test results, eating habits, caring experience, provider interaction was shown to be factors for self-empowerment. In addition, logistic regression showed provider interaction and eating habit increased self-empowerment.

Socio-demographic such as eating habits was one of factors associated with self-empowerment among patients with diabetes mellitus. This finding was consistent with previous study that habits or behavior also cognitive were factors associated with self-empowerment (7). Behavior was reflected good self-management for caring for chronic disease (7) and good self-management will induce good self-empowerment (8). Also caring experience was one of factors associated with self-empowerment. This finding was consistent with previous study that experience will lead to good self-management (7,10) and it relates to self-empowerment (8).

Our study also showed that provider interaction was factors associated with self-empowerment. Provider interaction is a part of health literacy (15). This finding was consistent with previous study that health care providers contribute to patient self-empowerment. Positive interactions between patients and health care providers contribute to increasing confidence. This good interaction ends with the patient’s positive attitude, satisfaction and active involvement in care (19). Health Literacy without self-empowerment will decrease ability to protect health status (20).

Furthermore, our study showed that self-efficacy and coping strategies were no significant difference in self-empowerment among patients with diabetes mellitus. This study was not consistent with previous study (7,10). We assumed that it relates with characteristic of respondents. Our respondents had time variance of suffering diabetes mellitus from less than one year to more than ten years.

Our study had limitation that was we collect the data used cross-sectional design so the results may be generalized carefully but this study help to identify factor related with self-empowerment among patients with diabetes mellitus. Longitudinal study is needed to develop model in term of self-empowerment among patients with diabetes mellitus.

Conclusion

Provider interaction and eating habit had significant increase on high self-empowerment. Further study is needed to motivate patients with diabetes mellitus in term of eating habit also for health care provider to interact with patients to improve self-empowerment.

Ethical Clearance: All procedure of this study was granted IRB from Health Research Ethics Committee, Poltekkes Kemenkes Banjarmasin (Health Polytechnic, Ministry of Health, Banjarmasin, Indonesia).

Source of Funding: Research funding was supported from Poltekkes Kemenkes Banjarmasin (Health Polytechnic, Ministry of Health, Banjarmasin, Indonesia) year 2018.

Conflict of Interest: No potential conflict was reported in this article

References

7. Lorig KR, Holman HR. Self-management


Irisin, Resistin and 25-Hydroxyvitamin D in Iraqi Obese and Non-Obese Type 2 Diabetic Patients

Gumar O Zamil¹, Halla G Mahmmod², Basil O Saleh³

¹Clinical Biochemistry, Ibn Al-Baladi Children’s and Women’s Hospital, Ministry of Health, Baghdad, Iraq, ²Clinical Biochemistry, Department of Biochemistry, College of Medicine, University of Baghdad, Baghdad, Iraq, ³PhD, Clinical Biochemistry, Department of Biochemistry, College of Medicine, University of Baghdad, Baghdad, Iraq

Abstract

Objective: evaluate the serum levels of irisin, resistin, and vitamin D in a population of Iraqi obese diabetic men and to compare non-obese diabetic men.

Methods: A case-control study, carried out from July 2017 to January 2018, and included 160 men; 80 patients with type 2 diabetes mellitus (DM) and 80 aged- and BMI matched apparently healthy men. The Subjects subdivided according to their BMI into; obese, overweight and normoweight. Investigations included serum measurements of fasting serum glucose (FSG) and lipid profile, 25-Hydroxyvitamin D, resistin, irisin and insulin.

Results: Serum resistin levels and 25-hydroxyvitamin D did not differ significantly among groups of diabetic men and healthy men with respect to their obesity. Serum irisin concentrations were significantly decreased in diabetic obese when compared with that of healthy obese. While, the mean values of serum irisin of diabetic overweight and diabetic normoweight were higher than those of healthy overweight and normoweight, but did not reach the significant level. The results also showed that there was significant positive correlation between serum 25-hydroxyvitamin D levels and irisin concentrations in diabetic obese group (r=0.398, P<0.022).

Conclusion: The present study suggested the significant role of irisin myokine in pathogenesis of diabetes mellitus type 2, while that of resistin and vitamin D need to be evaluated in one more large study. Obesity may have an important effect on blood levels of irisin and vitamin D.

Keywords: Diabetes mellitus, obesity, 25-hydroxyvitamin D, Irisin, resistin

Introduction

Diabetes mellitus (diabetes) is a metabolic disorder with heterogeneous etiologies, which is characterized by chronic hyperglycemia and disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action or both¹. Obesity has been recognized as one of the most important single risk factors in the pathogenesis of type 2 diabetes mellitus. In obese individuals there are marked increases in the secretion of pro-inflammatory adipokines including resistin, IL-6 and TNF-α and decreased production of anti-inflammatory adipokines such as adiponectin², ³. In humans, resistin is mainly secreted by macrophages, which suggests that resistin is linked to inflammation. Obesity and T2DM have been recognized as chronic inflammatory disorders that may be connected to pro-inflammatory cytokines and various adipokines, including resistin⁴. Irisin is a myokine that causes brown coloration of white fat, promotes fat burning and inhibits weight gain. Irisin is associated with glucose/lipid metabolism⁵ and may prevent obesity and onset of diabetes⁶, ⁷.

Correspondence author:
Basil O Saleh
Telephone: +9647904407625
E-mail: basil_omsal@yahoo.com
Vitamin D is not only essential for maintaining bone health, but it also plays a role in several other biochemical mechanisms within the human body. The mechanism of action of the active form of vitamin D is similar to that of other steroid hormones and is mediated by its binding to vitamin D receptor (VDR). VDRs are found in most tissues, not just in those that participate in the classic actions of vitamin D such as bones, intestines and kidneys, and the enzyme responsible for converting 25 (OH)D to 1,25(OH)2D is also expressed in a variety of extra-renal sites, such as endothelial cells, beta cells, and immune cells. The complex biochemical interactions between adipose tissue and vitamin D in vitro raise the question as to whether hypovitaminosis D itself, may contribute to obesity or inhibit weight loss in vivo. Several studies have indicated a relationship between vitamin D status and the risk of diabetes or glucose intolerance. Vitamin D has been proposed to play an important role and to be a risk factor in the development of insulin resistance and the pathogenesis of type 2 DM by affecting either insulin sensitivity or β-cell function, or both. The aim of the present study is to evaluate the serum levels of irisin, resistin, and vitamin D in a population of Iraqi obese diabetic men and to compare the results with those of non-obese diabetic men.

Method

Study design

This case-control study was carried out at Department of Biochemistry, College of Medicine, University of Baghdad, at Al-Imam Ali Hospital and at Research laboratory for the College of Health and Medical Technology/Baghdad, Iraq during the period from July 2017 to January 2018. It consisted of 160 men subjects; 80 men patients with type 2 diabetes mellitus and 80 apparently healthy men age and BMI matched with patients. The patients and controls were also subdivided according to their obesity into different groups: normo-BMI group which consisted of 28 men with BMI range between 18.5 – < 25 kg/m² and aged (40 – 65 years), overweight group consisted of 19 men with BMI range between 25 – < 30 kg/m² and aged (40 – 65 years), and obese group which included of 33 men their BMI was more than 30 kg/m² and aged (40 – 65 years). Formal consent was taken from each men.

Data setting

Blood sample was taken in the fasting state from peripheral vein of each patient and control. The aspirated blood sample allows clotting for 30 minutes, centrifuged at 3000 rpm. The fasting serum glucose and lipid profile parameters were measured in the same day of blood collection by Abbott c4000 automatic biochemical analyzer. The remainder fraction of separated serum was frozen at – 20 °C until the day of estimation of serum insulin levels using enzyme immunoassay kit (Demeditec, Germany), homeostasis model assessment of insulin resistance (HOMA-IR) and (HOMA-B) were derived from fasting glucose and insulin level by using equation, serum irisin levels were determined by using a commercially available human ELISA kit (cat no. MBS2600406, MyBiosource, USA), serum resistin was measured by using a human resistin demeditec elisa kit (Germany), and serum 25(OH)D level was estimated by using a commercially available human 25-hydroxyvitamin D ELISA kit (Human, Germany).

Statistical analysis

Statistical analysis was performed by using SPSS version 24 for window was used for all statistical analysis. Statistical significance was assessed by ANOVA and student t-test. The linear regression test was applied for the correlation between different parameters, and the significance of the p-value was checked using t-test. P-value of less than 0.05 was considered significant.

Results

Table 1: Illustrate serum levels of various markers according to studied groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>D.obese</th>
<th>H.obese</th>
<th>D.over</th>
<th>H.over</th>
<th>D.norm</th>
<th>H.norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>33</td>
<td>33</td>
<td>19</td>
<td>19</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>FSG (mmol/l)</td>
<td>10.21±4.11*</td>
<td>5.32±0.49</td>
<td>10.81±4.10*</td>
<td>5.1±0.57</td>
<td>13.92±3.89*</td>
<td>4.76±0.76</td>
</tr>
<tr>
<td>Insulin (µIU/ml)</td>
<td>22.12±17.54NS</td>
<td>22.38±17.30</td>
<td>13.99±5.31**</td>
<td>8.11±3.61</td>
<td>7.48±3.21NS</td>
<td>8.22±3.06</td>
</tr>
</tbody>
</table>
Table 1: Assessment of various markers in Diabetic Patients and Healthy Controls Groups

<table>
<thead>
<tr>
<th></th>
<th>D obese</th>
<th>H obese</th>
<th>D over</th>
<th>H over</th>
<th>D norm</th>
<th>H norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOMA-IR</td>
<td>10.15±9.22***</td>
<td>5.49±4.61</td>
<td>6.92±4.42***</td>
<td>1.85±0.85</td>
<td>4.87±3.90***</td>
<td>1.76±0.77</td>
</tr>
<tr>
<td>HOMA-β</td>
<td>103.50±107.8****</td>
<td>256.9±150.0</td>
<td>59.42±61.50****</td>
<td>120.48±79.36</td>
<td>26.46±29.80****</td>
<td>139.23±67.56</td>
</tr>
<tr>
<td>Resistin (ng/ml)</td>
<td>5.09±1.36NS</td>
<td>4.74±2.32</td>
<td>4.85±2.38NS</td>
<td>4.58±1.54</td>
<td>4.60±2.33NS</td>
<td>4.51±2.49</td>
</tr>
<tr>
<td>Irisin (ng/ml)</td>
<td>2.73±1.48*</td>
<td>3.92±2.71</td>
<td>4.56±1.72 NS</td>
<td>4.01±2.14</td>
<td>4.90±4.79NS</td>
<td>4.63±4.81</td>
</tr>
<tr>
<td>25- Hydroxyvitamin D (ng/ml)</td>
<td>17.22±4.33NS</td>
<td>19.10±5.69</td>
<td>19.78±4.84NS</td>
<td>18.98±5.02</td>
<td>17.80±7.12NS</td>
<td>20.31±6.70</td>
</tr>
</tbody>
</table>


Discussion

In the present study, the serum 25(OH)D values were lower than the ideal level of 32 ng/mL (80 nmol/L). However, the range of the serum 25(OH)D concentration in the participants was in accordance with that in a number of other studies establishing the prevalence of vitamin D deficiency in T2DM. In our study the controls (normo-BMI, overweight, obese) presented mean vitamin D levels within the lower range of vitamin D insufficiency and averaging (20.31±6.70, 18.78±5.02, 19.1±5.69 ng/mL, respectively). This finding corresponds to concentrations reported for the Central European general population (17-to-33 ng/mL in mean) from cities in similar latitude. For obese patients with diabetes, we revealed a significant positive correlation between irisin and serum 25(OH)D levels (r= 0.398, p=0.022). This finding corresponding with Nasser M Al-Daghri et al. who found a significant increase in circulating irisin at 12 months post-vitamin D intervention. The elevation in circulating irisin was parallel to the increase in vitamin D level. The possible mechanisms of the involvement for 25(OH)D include the following; 1) Vitamin D can reduce IR in peripheral tissues by regulating inflammatory cytokines and inhibiting the expression of PPAR-γ. Besides, it can affect insulin sensitivity by stimulating PPAR-δ and the gene expression of insulin receptor. 2) Another possible mechanism may involve the direct involvements of both irisin and vitamin D in energy metabolism and regulation as well as adipocyte biology through uncoupling proteins.
Resistin is an adipokine that functions as a pro-inflammatory biomarker and a mediator of obesity-related insulin resistance. The pro-inflammatory effects of resistin were attributed to its ability to activate the nuclear factor-κB signaling pathway and subsequently enhance the production of pro-inflammatory cytokines, including TNF-α and IL-6, which impair insulin signaling pathways and result in the development of insulin resistance. In addition, TNF-α and IL-6 have been shown to alter the expression of PPARγ in adipocytes. PPARγ is an anti-inflammatory nuclear protein with insulin sensitizing functions. The current study did not reveal any relationships between 25(OH)D and resistin. These results are consistent with those reported by other scientists.

According to the National Health and Nutrition Examination Survey (NHANES III) reports, physical activity is related to serum 25(OH)D either due to enhanced vitamin D metabolism or increased sun exposure. Wanner et al. reported significantly higher levels of 25(OH)D in those who exercised outdoors than in those who exercised indoors. Moreover, it was reported that exercise training is associated with systemic anti-inflammatory effects, with a reduction in pro-inflammatory markers such as IL-6 and TNF-a in plasma.

**Conclusion**

The present study suggested the significant role of irisin myokine in pathogenesis of diabetes mellitus type 2, while that of resistin and vitamin D need to be evaluated in one more large study. Obesity may have an important effect on blood levels of irisin and vitamin D.

**Conflict of Interest** : None

**Ethical Clearance**: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by Scientific Committee of the Biochemistry Department, College of Medicine, University of Baghdad.

**Source of Funding**: The work were supported by authors only

**References**

not with normal glucose tolerance. Diabetologia. 2012;55(6):1668-78. https://doi.org/10.1007/s00125-012-2529-x


Diagnostic Value of Clinical Assessment in Comparison to Ultrasound in Meniscal Injury

Mahmoud Khudair Yaseen¹, Faiq I. Gorial²
¹Department of Surgery, ²Department of Medicine, College of Medicine, University of Baghdad, Baghdad, Iraq

Abstract

Background: Meniscal injury has significant impact on patients’ quality of life. Reports on comparison of clinical assessment with Ultrasound are limited.

Objective: To assess the diagnostic value of clinical assessment in comparison with ultrasound (US) in meniscal injury.

Patients and Method: This observational cross sectional diagnostic accuracy study involved 50 patients with clinical features of meniscal tears. Ultrasound was done for each patients and read by a single radiologist blinded to the clinical features and diagnostic accuracy was measured.

Results: There was no statistical significant difference between clinical assessment and US. Meniscal injury detected by clinical assessment was 41(82%) patients versus 35(70%) patients detected by US evaluation, \(p=1.00\). Krippendorf alpha 0.023, percent of agreement 64%). Diagnostic performance of clinical assessment of meniscal injury was accuracy 82%, sensitivity 83%, positive predictive value (PPV) 70.73%, negative predictive value (NPV) 33.33%, positive likelihood ratio (LR+) 1.04, negative likelihood ratio (LR-) 0.86%, and diagnostic odds ratio (DOR) 1.21.

Conclusions: Clinical assessment was a reliable and a valid method for diagnosis of meniscal injury compared to US evaluation.

Keywords: Meniscal tears, knee injury, ultrasound, clinical features, clinical assessment

Introduction

Menisci are 2 semilunar wedges between the tibia and the femur in the knee joint. medial meniscus is C shaped and the lateral meniscus is O shaped (1,2). Meniscal injuries are the most common cause of knee injury which is caused mostly by direct knee trauma. When injury occurs, the superficial MCL is the most commonly damaged ligament of the knee, usually induced by valgus stress, and can occasionally be accompanied by a tear in the medial meniscus (3,4). Meniscal tears are seen in young and old patients .The correct diagnosis of meniscus tears is very important to give the accurate in tie treatment .Full history and clinical examination can assist in differentiation of knee pain due to meniscal tears from other causes (5–7) Studies have showed that US is a non-invasive real-time imaging modality and the primary alternative diagnostic tool to MRI for evaluating meniscal injuries (8,9).

Clinical assessment compared to MRI has been reported, however the studies reported the comparison between clinical and ultrasound evaluation to diagnose meniscal tears were limited (10–16) Up to the best of our knowledge there is no study Iraq to compare clinical assessment with US evaluation of meniscal injuries. Accordingly, the aim of this study was to assess the diagnostic value of clinical assessment in comparison with ultrasound (US) in meniscal injury.

DOI Number: 10.5958/0976-5506.2019.00733.2
Patients and Method

Study design

This observational cross sectional diagnostics accuracy study was conducted at Orthopedic and Rheumatology Units at Baghdad Teaching Hospital from August 2013 to August 2014. We compared clinical assessment with US for diagnosis of meniscal injury and assessed the diagnostic accuracy and validity of clinical assessment.

Sample selection

Elligible Patients with age >18 years and had knee pain were included in this study. Exclusion criteria included patients who other comorbid systemic diseases, taking medications like corticosteroids and diuretics or evidence of loose bodies on plain radiographs, or any prior surgery that may cause knee pain.

Data entry and evaluation

Data collection included age, sex, history of trauma, knee pain, tender joint line, positive McMurray’s test, and positive Apply test for meniscal injury performed by an orthopedist. Ultrasound (Netherland, Phillips, HD 11XE, transducer L12-3). A single expert radiologist blinded to the clinical assessment performed the US and read it.

Statistical analysis

Statistical software (SPSS version 23, IBM, USA) was used for analysis. Shapiro- Wilk test was used to assess the normal distribution of continuous variables. Normally distributed continuous variables were presented as mean ± standard deviation (SD) and categorical variables were presented as numbers and percentiles. Sensitivity, specificity, positive predictive, negative predictive values, accuracy, positive likelihood ration, negative likelihood ration, and diagnostic odd ratio were calculated. Fisher exact test was used to measure the difference between 2 categorical variables. P-value < 0.05 was considered statistically significant.

Results

A total of 50 patients involved in this study. Their mean of age was 35.44 ± 12.09 years. Of those, most of the patients were males [36 (72%)].

Clinically Meniscal tear was detected in 41 (82%) patients and was absent in 9 (18%) patients. While US was positive for meniscal tears in 35 (70 %) patients and was negative in 15 (30%) patients. There was no statistical significant difference between clinical assessment and US evaluation (p=1.00), percent of agreement was 64% and krippendorf alpha =0.023 as shown in figure 1. the clinical assessment was a reliable measure for diagnosis of meniscal injury.

Figure1: Comparison between clinical assessment with Ultrasound evaluation of meniscal injury.

Table 1 shows validity parameters of clinical assessment of meniscal injury. It revealed that Clinical assessment was a valid measure to diagnose meniscal injury with diagnostic Odd raio=1.21 and very good accuracy of 82%, sensitivity was 83%, and establish the diagnosis with confidence ( PPV=70.73%), specificity 20 %, positive likelihood ratio (LR)=1.04, and negative LR 0.86, NPV 33.33, specificity=20%

Table1: Validity parameter of Clinical assessment in diagnosis of meniscal injury

<table>
<thead>
<tr>
<th>Test</th>
<th>Diagnostic measures</th>
<th>performance</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical assessment positive for meniscal injury</td>
<td>Sensitivity</td>
<td>83%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Specificity</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accuracy</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPV</td>
<td>70.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NPV</td>
<td>33.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LR +</td>
<td>1.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LR -</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagnostic Odds Ratio</td>
<td>1.21</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

This observational diagnostic accuracy cross-sectional study assessed the diagnostic value of clinical assessment compared with ultrasound (US) in meniscal injury. It showed no significant difference between clinical assessment and US evaluation of meniscal injuries. In addition, clinical assessment of meniscal injuries had good percent of agreement with US evaluation with high diagnostic accuracy, PPV, and sensitivity, but low specificity and NPV. The results were valid and reliable. The current findings are clinically important for early diagnosis and treatment of meniscal tears.

Up to our knowledge, the current study is the first study that compared clinical assessment with US evaluation for diagnosis of meniscal tears. However, several studies compared Clinical assessment with MRI or arthroscopy or US with MRI and arthroscopy. Yan et al (17) identified the sensitivity and specificity of clinical tests and elements of patients’ history with a high predictive value, and assessed the combined diagnostic accuracy of sensitivity and specificity of clinical tests and elements of patients’ history with MRI. They concluded that Giving way, locking and McMurray’s test are independent clinical diagnostic factors for the diagnosis of meniscal tears. MRI has higher accuracy, sensitivity and NPV for the diagnosis of meniscal tears than giving way, locking and McMurray’s test. The combination of giving way, locking, McMurray’s test and MRI for confirmation is typical for a meniscal lesion diagnosis. Based on these findings, MRI should be used in a standard manner to detect meniscal tears found during arthroscopy.

Konan et al (18), studied the role of physical diagnostic tests in screening for meniscal tears and to validate the diagnostic accuracy of the Thessaly test and found that Physical tests may not always be diagnostic of meniscal tears. MRI and arthroscopy may be essential in dubious clinical presentations and especially where more than one pathology is suspected. Our study showed that the Thessaly test in isolation was not useful for the detection of meniscal tears but it helps to increase diagnostic certainty when combined with other standard tests.

Goossen’s et al (19) evaluated the diagnostic accuracy of the Thessaly test compared with an arthroscopic examination in patients with suspected meniscal tears and found that Thessaly test alone or combined with the McMurray test is useful for determining the presence or absence of meniscal tears. Mahdy et al (20) determined the clinical usefulness of ultrasonography for diagnosis of meniscal pathology in patients with acute knee pain and compare its diagnostic accuracy to MRI in a clinical setting.

Gorial and Yaseen (10) evaluated the validity of clinical assessment in comparison to magnetic resonance imaging in diagnosis of medial meniscal tear in a sample of Iraqi patients and demonstrated that clinical assessment is a valid, easy, and simple tool in diagnosis of medial meniscal injury in Iraqi patients with high sensitivity, high diagnostic accuracy, and very high positive predictive value.

This study has some limitations: first, the small sample size of the patients involved in the study. Second, because patients were selected from a tertiary center where the cases are referred with a previous clinical suspicion of meniscal tear is expected so selection bias may be present. However, these limitations can be solved by a larger sample multicenter study.

Despite of these limitations, the clinical assessment is a simple cheap and rapid method for diagnosis of meniscal tears and up to our knowledge this study is the first study that compared clinical assessment with ultrasound for diagnosis of meniscal tears in which validity parameters and reliability were measured.

In conclusion, clinical assessment of meniscal injury was a valid and reliable measure to diagnose meniscal tears compared with US with high accuracy. This may help in early detection of meniscal tears and subsequent appropriate treatment and good prognosis.

Conflict of Interest: The authors declare that there is no conflict of interests between them.

Source of Funding: The source of funding was by authors.

Ethical Clearance: Ethical approval was obtained from the Ethics Committee of University of Baghdad, College of Medicine, Medical Department and Informed consent was obtained from each participant included in this study.
References


10. Gorial FI, Yaseen MK. Validity of Clinical Assessment In Comparison To Magnetic Resonance Imaging in Diagnosis of Medial Meniscal Tear in a Sample Of Iraqi Patients: A Single Center Study. IOSR-JRME 2014 ; 4(6): 39-41


Legal Protection of Midwives Based on Professional Justice in Midwifery Practices

Fitriani Nur Damayanti¹, Absori Absori², Kelik Wardiono²
¹Lecturer at University of Muhammadiyah Semarang, ²Lecturers at University of Muhammadiyah Surakarta, Kedungmundu Raya Street No.18 Semarang, Central Java, Indonesia

Abstract

Introduction: The authority of a midwife is limited in carrying out health service practices. Midwives in childbirth assistance may only handle physiological labor without complications, and there are some regions that have determined that childbirth must be handled at the Community Health Centers (puskesmas) with the midwife of Community Health Centers (puskesmas). In Semarang City, there are only 7 public health centers with the PONED Community Health Center (Basic Essential Obstetrics Service) which is the place of birth delivery. This is not comparable with the number of births each year totaling 26,337 people. In addition, for family planning services and immunization services, midwives are only allowed to deal with government health care facilities and in carrying out government duties.

Material and Method: Sampling was done by non-probability sampling technique with snowball technique. The sample used was Respondents determined by snowball sampling technique of a number of respondents 17 people.

Findings: Indicators of professional justice consisted of equal rights and opportunities. Equity rights were obtained which met as much as 25%. And that didn’t meet as much as 75%. The same opportunity was obtained which met as much as 40%. And that didn’t meet as much as 60%. From the results of an interview with the Head of the Indonesian Midwives Association (IBI) Semarang City, it was stated that professional justice in midwifery regulations did not yet exist, because midwifery regulations were still being fought for in the midwifery law. In addition, the results of interviews with the Health Department of Semarang City on professional justice in midwifery regulations stated that there were no equal rights in midwifery regulations.

Conclusion: Legal protection of midwives based on professional justice in midwifery practices based on professional justice must fulfill the conditions reflected in the values of justice, namely having equal opportunities and equal rights. The step to realize professional justice is by understanding that legal protection for midwives is not merely a positive norm in legislation but must be understood that social behavior in interaction is legal terminology that does not only fulfill legal certainty requirements but also benefits and justice as law.

Keywords: Legal Protection, Midwives, Professional Justice.
there is only one Community Health Center and that is not yet a PONED Community Health Center. So far, independent practice midwives are considered as one of the causes in the high maternal mortality rate and infant mortality rate.

Midwives are demanded for higher education, but in reality, midwifery professional education, midwifery education, midwifery master’s education are only available at certain institutions. It is difficult to get the education establishment permit. Even though the number of midwives in Indonesia in 2016 was 448,783 and not all were able to continue their education with the difficulty of institutions that had further education. This is very ironic with midwives as the spearhead in maternal and child health services.

The injustice in the risk of maternal mortality has been inseparable from the increasing issue surrounding most health policy debates. Even so, a law is needed for legal protection of health workers. The political product of midwives does not yet have a specific law regulating midwifery. The regulation is only still a regulation of the health minister who has not yet had consistency between the competence and authority of the midwife to realize the professionalism of professional justice-based midwives.

Material and Method

Sampling was done by means of non-probability sampling technique with snowball technique. The samples used were respondents determined by snowball sampling technique of a number of respondents 17 people consisting of the Head of the Indonesian Midwives Association (IBI) Semarang City, the Health Department of Semarang City, and the Independent Practice Midwives. The data analysis technique used was the analysis of qualitative data.

Findings

A. Professional Justice

1. Equality of Rights

Table 1

<p>| The Data on Equality of Rights |
|---------------------------|------------------|</p>
<table>
<thead>
<tr>
<th>Equality of Rights</th>
<th>Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulfilled</td>
<td>4</td>
</tr>
<tr>
<td>Not fulfilled</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

From the data on the frequency distribution of respondents’ answers to the equality of rights in the independent practice of midwives, it was found that stated equal rights fulfilled as much as 25%. And those who did not fulfill the midwife’s independent practice were 75%. From the results of interviews with the Head of the Indonesian Midwives Association (IBI) in Semarang City and with the Health Department of Semarang City, on equality of rights in midwifery regulations stated that there were no equal rights in midwifery regulations.

Equality of rights in the health profession is part of human rights. This is contained in the charter of Medina (Piagam Madinah) which is a constitution that was formulated by the Prophet Muhammad which contained human rights. Some of the human rights provisions include: Recognition of the right to life, the right to freedom, equality rights, justice rights. In Law No. 39 of 1999 concerning Human Rights, arrangements regarding human rights are determined based on the United Nations Declaration of Human Rights, United Nations Convention on the Elimination of All Forms of Discrimination against Women, United Nations Convention on the Rights of the Child, and various other international instruments governing human rights.

Human rights to health are recognized in international devices. The Universal Declaration of Human Rights (UDHR), article 5 paragraph 1 states that every human being has sufficient standard of living, for the health of himself and his family, there is no single profession more important than other professions, there is no superior profession and inferior profession.

However, at present, the pressure on midwives is very strong, because of the fewer professional midwives who practice midwifery services. Midwives struggle and mobilize to maintain and strengthen professions that can make an important contribution in the quality of
midwifery services for women and children. Apart from obstacles, midwives continue to try to maintain and strengthen the profession. They sought support for the passing of the midwifery law. An important role needs to be done by midwife professional organizations, whose central axis is the work of keeping midwives engaged and active in professional matters. Organizations are more effective because they become more organized the better, the more likely the action is for their professionals.

In Law Number 36 of 2009 concerning Health in article 4 paragraph 1 states that everyone has the right to health. In Law No. 36 of 2014 concerning Health Workers in article 57 states that health workers in carrying out the right practice obtaining legal protection as long as carrying out duties in accordance with professional standards.

Minister of Health Regulation Number 28 of 2017 concerning Permission and Implementation of Midwife Practices in article 29 states that in implementing midwifery practices, midwives have the rights obtaining legal protection as long as carrying out its services in accordance with professional standards.

2. Equal Opportunities

Table. 2: Frequency Distribution of Respondents’ Answers Regarding the Indicator of Justice about Equal Opportunities in the Independent Practice of Midwives

<table>
<thead>
<tr>
<th>Equal Opportunity</th>
<th>Respondents</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulfilled</td>
<td>6</td>
<td>40</td>
</tr>
<tr>
<td>Not Fulfilled</td>
<td>9</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primary data processed in 2018

From the data on the frequency distribution of respondents’ answers about the same opportunity in the independent practice of midwives, it was found that in an independent practice the midwife stated that the same opportunity fulfilled as much as 40%. And those who did not fulfill the midwife’s independent practice were 60%. From the results of interviews with the Head of the Indonesian Midwives Association (IBI) in Semarang City and with the Health Department of Semarang City, it was stated that the value of justice in midwifery regulations did not yet exist, because midwifery regulations were still being fought for in the midwifery law.

The same opportunity is someone who has the same opportunity of one individual with the others. Please note that the same opportunity as one whole. That is, the value of an opportunity depends on the specifications of other opportunities and must be considered in preparing the constitution and legislation in general.

In the development of health personnel, it essentially has equal opportunities and focuses on career development, namely a continuous process that consists mainly of career planning. In the Regulation of the Minister of Health No. 28 of 2017 article 18 concerning authority, the authority of midwives is very limited. It is supposed to be a professional midwife between the competence and authority of midwives arranged in harmony.

According to Hart, being fair and unfair is a form of moral criticism that is more specific than good or bad, it is clear that logically it could be claimed law either because it is fair, or bad because it is unfair, actually it cannot be like that. Law is seen as unfair if the burden of distribution and the benefits of both are discriminated against among people by referring to any characteristics, including the dominant profession ego.

B. Legal Protection of Midwives Based on Professional Justice

Health is needed for human welfare, providing intrinsic value for comfort and satisfaction. Justice refers to the idea of creating an egalitarian culture or institution, respecting human rights, and recognizing the dignity of every human being. Human rights guarantee the most basic rights of all rights possessed by humans solely directed to the interests of the man himself in a narrow sense and by recognizing and respecting the dignity of humanity.

The emphasis for Rawls is that justice for this equality does not merely distribute primary values fairly, but also how this principle of justice is positioned for cooperation in a well-ordered society. The point is that Rawls accommodates the principle of equality as a basic value of justice. Also accepting inequality.
Professional values of justice not only belong to law enforcers but in carrying out their professionalism, midwives also have a value of justice. Midwives must uphold morals and legal principles, client molarity and integrity. The principles of justice state that every person has the right to carry out all aspects of his life to the fullest. The injustice of midwives will have a negative impact on women, babies, and families. This gap is not in accordance with the principle of justice. Injustice in midwives often occurs. It must close the health gap where all health workers can build consensus and where individuals accept personal responsibility. However, at present, there are always values of injustice in midwives. In justice there are two indicators of achieving the value of justice, namely equal rights and equal opportunities.

In midwifery services, the midwife’s independent practice must also fulfill the patient’s rights. This is a legal relationship between midwives and patients called a therapeutic agreement. The relationship between the patient and midwife is a business engagement (inspannings verbintenia) that is where in carrying out their duties the midwife strives to cure or restore the patient’s health.

In a relation arising from an agreement, the fulfillment or violation of the points of the agreement can result in a violation of the therapeutic agreement. This right arises from the party being promised a loss in the form of costs that have actually been incurred, losses incurred and expected profits (wintsderving) that were not received due to the breach of the promise. It is necessary to establish education criteria in accordance with the competence and authority of midwives in midwifery services. In order to avoid midwife discrepancies between authority, competence, regulation and midwife education. Midwife education professionals will provide quality services for the community. The regulation of midwives is currently not in accordance with the regulations that exist in nursing and medicine.

Legal protection of midwives based on professional justice in midwifery practice based on professional justice must fulfill the conditions reflected in the values of justice, namely having equal opportunities and equal rights. Everyone has equal opportunities for the broadest basic freedoms, as broad as the same freedom for everyone. Legal protection with professional justice can be realized through harmonious cooperation between the ministries of health, professional organizations, legislators, and related institutions or agencies in synergy by prioritizing the values of justice and respecting the right to professional equality by ignoring sectoral ego interests as a profession. One step to realizing it is by understanding that legal protection for midwives is not merely a positive norm in legislation but must be understood that social behavior in interaction is legal terminology that does not only fulfill legal certainty requirements but also benefits and justice as law.

**Conclusion**

Indicators of professional justice consisted of equal rights and equal opportunities. Equity rights were obtained which met as much as 25%. And that didn’t meet as much as 75%. The same opportunity was obtained which met as much as 40%. And that didn’t meet as much as 60%. Legal protection of midwives based on professional justice in midwifery practice based on professional justice must fulfill the conditions reflected in the values of justice, namely having equal opportunities and equal rights. The step to realizing professional justice was by understanding that legal protection for midwives was not merely a positive norm in legislation but must be understood that social behavior in interaction was a legal terminology that did not only fulfill legal certainty requirements but also benefits and justice as law.

**Conflict of Interest**: There is no

**Ethical Clearance**: The Ethical Issue of the Medical Research Bioethics Commission of Medicine, Faculty of Medicine, University of Sultan Agung Semarang, Central Java, Indonesia.

**Source of Funding**: This research was financially supported by LPDP.

**References**

on 16 November 2017.


6. The results of interview with The Indonesian Midwives Association (IBI) Semarang City and the Health Department of Semarang City, 2018.


12. Law (Undang-Undang) No. 36 of 2009 about health.

13. Law (Undang-Undang) No. 36 of 2014 about health workers.


Study of Biochemical Criteria of Blood for Thalassemia Patients

Hanan Jassim Hammod¹, Zainab Kareem Al-Kazazz¹, Hassan A Farman²

¹Department of Babylon Technical, Al-Furat Al-Awsat Technical University, Iraq,
²College of Health and Medical Technical – Al-Kufa, Al-Furat Al-Awsat Technical University, Iraq

Abstract

This study was conducted for a samples of thalassemia patients who included males and females as well as healthy people as compared. We were measured liver enzymes(ALK, GOT, GPT), blood parameters such as $\text{WBC}_5$ count, $\text{RBC}_5$ count, hemoglobin deposition rate Erythrocyte Sedimentation Rate (ESR), hematocrit or packed red cell volume (PCV) and Quantity of iron.

The results displayed that there were a significantly difference increase in the values of iron and liver enzymes (ALK, GOT, GPT) among thalassemia patients and control under the level of probability (0.05) for males and females, and There was as well a significantly difference increase and decrease in blood parameters for (WBC, RBC, Hb, PCV) and did not showed significantly difference between patients and control in the ESR. When comparing the results between male and female patients with thalassemia, the results appeared that there is a significantly difference increase between them and that Thalassemia directly affects males more than females, especially in the liver enzymes, but iron has recorded a clear reduction in males compared to females and did not record blood standards any significant difference Between males and females despite the higher value of white blood cells in males compared to females.

Keywords: thalassemia, GOT, GPT, PCV, Hb.

Introduction

Thalassemia is a usual inherited sickness in the world and causes serious problems for the Mediterranean region in public health.¹ Thalassemia is a hereditary condition described through insufficient production of hemoglobin and can be divided of the genes affected to alpha and beta attributed to the protein chains that make up the proper hemoglobin.² Thalassemia is common in the Mediterranean, the Indian subcontinent, northern Africa, Eastern Europe and many parts of the world.³ One of the major clinical signs of thalassemia is that it suffers from red blood cell hypertrophy with the formation of myeloid blood with gallstones.⁴ In the first year of the life of patients with thalassemia, they have severe sepsis and need permanent blood transfusions. However, excess iron overload and organ damage should be removed due to repeated transfers.⁵ Iron overload in patients who do not need blood transfusions is that gastrointestinal abortions, especially the liver, absorb excess iron.⁶ Diseases such as hypothyroidism, diabetes or gonadal dysfunction were not observed in patients with central thalassemia despite iron overload.⁷ Therapists of thalassemia patients have become increasingly incremental loading of iron from major complications.⁸ The calculation of the amount of liver enzymes that increase due to the toxic effect of iron directly and because of the liver disease on liver cells, which is the most obvious way to identify liver damage.⁹ Acute thalassemia patients suffer from erythroid activity in blood-forming areas, causing lymph nodes, liver and spleen, and in some patients, tumors outside the intestines.¹⁰ Studies have shown that there is an increase in the level of liver enzymes and decreased hemoglobin in patients with thalassemia.¹¹ This study was conducted to measure the liver enzymes (ALK, GOT, GPT) and the level of iron addition packed cell volume (PCV) to the number of erythrocytes and leukocytes in the blood of thalassemia patients.

Ingredients and Procedures

The study was accomplished on a sample of 165
people, including 105 people with Thalassemia, including 62 males and 43 females. The control sample included 60 healthy people distributed equally between males and females. The samples were taken from patients from (Babylon Hospital for Childbirth and Children). Some of the blood values such as (ALK, GOT, GPT, Iron) and some blood parameters (WBC<sub>S</sub>, RBC<sub>S</sub>, Hb, PCV, ESR) were included in the thalassemia center.

Statistical Analysis The results were analyzed by using the (SPSS). Analysis of variance by ANOVA table as well as excretion mean and standard deviation depending on basic statistic method.

**Result**

The products of the study displayed that thalassemia has a direct effect on some of the blood chemistry and some blood parameters of both sexes.

There was a significantly difference increase between patients with thalassemia and control (male and female) in liver enzymes (Table 1)

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sex</th>
<th>(ALK)* (u/L)</th>
<th>(GOT)* (u/L)</th>
<th>(GPT)* (u/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Patient N=62</td>
<td>125.480± 9.581</td>
<td>44.034± 8.622</td>
<td>6.595±</td>
</tr>
<tr>
<td></td>
<td>Control N=30</td>
<td>58.066± 3.513</td>
<td>±37.427 0.411</td>
<td>17.53± 0.433</td>
</tr>
<tr>
<td>Female</td>
<td>Patient N=43</td>
<td>83.00± 8.662</td>
<td>23.90± 5.087</td>
<td>23.15± 5.921</td>
</tr>
<tr>
<td></td>
<td>Control N=30</td>
<td>58.13± 4.150</td>
<td>13.52± 0.361</td>
<td>17.41± 0.455</td>
</tr>
</tbody>
</table>

P.vale 0.05

*mean +SD

As for the blood parameters, the results displayed that there was a significantly difference increase in valuable of WBC<sub>S</sub> and decrease in RBC<sub>S</sub>, Hb, PCV. except that ESR there was no significantly difference under the level of probability 0.05 in comparing the products between illness of males and females (table 2).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sex</th>
<th>WBC&lt;sub&gt;S&lt;/sub&gt; X10&lt;sup&gt;3&lt;/sup&gt;*</th>
<th>RBC&lt;sub&gt;S&lt;/sub&gt; X10&lt;sup&gt;6&lt;/sup&gt;*</th>
<th>Hb g/dl *</th>
<th>PCV % *</th>
<th>ESR * Mm/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>Patient N=62</td>
<td>7.38± 0.821</td>
<td>1.88± 0.08</td>
<td>10.50± 0.315</td>
<td>33.46± 0.951</td>
<td>17.80± 0.646</td>
</tr>
<tr>
<td></td>
<td>Control N=30</td>
<td>4.36± 0.414</td>
<td>±4.81± 0.133</td>
<td>13.86± 0.356</td>
<td>38.41± 1.620</td>
<td>16.86± 0.486</td>
</tr>
<tr>
<td>female</td>
<td>Patient N=43</td>
<td>9.57± 0.988</td>
<td>1.865± 0.08</td>
<td>10.00± 0.369</td>
<td>32.45± 1.118</td>
<td>18.60± 0.796</td>
</tr>
<tr>
<td></td>
<td>Control N=30</td>
<td>4.68± 0.362</td>
<td>4.993± 0.138</td>
<td>11.53± 0.496</td>
<td>39.66± 1.443</td>
<td>17.80± 1.596</td>
</tr>
</tbody>
</table>

P.vale 0.05

*mean +SD

Results displayed that thalassemia had a significant effect on the level of iron in the blood where the concentration of iron was significantly higher in illness with thalassemia compared with controller as in Figure(1) in both males and females. When comparing the concentration of iron between males and females, the results displayed that the iron level was greater in male illness than female illness as in Figure(1)
Discussion

The products of the study showed that there was a significantly difference increase below the level under 
(P≤0.05) raised in the level of liver enzymes GOT and GPT in patients compared to controller and this results
is agreed with the researchers of Asif M et al, 2014 (11), Bayejid H et.al, 2015 (12) and Patel et.al, 2018 (13) they
found an increase in liver enzymes in the illness with beta thalassemia when comparison to controller. Liver
enzymes are a sign of liver safety, which is high in thalassemia patients. It can be achieved that higher levels
of liver enzymes may be by reason of livers damage, produced by iron excess in illness many transfusions,
The increase in the amount of iron due to frequent blood transfusions leads to increased serum fractions and this
increase the feritin to an increase in liver enzymes may be due to more than that (11).

Thalassemia patients suffering from tissue damage are a major cause of blood transfusions and also suffer
from secondary iron overload (14). In patients with acute thalassemia, iron accumulates about 2-5 g per year, in
this way, and is stored by increasing iron loading as well as increasing the iron absorption of Gastro intestinal
track (15). This is consistent with our study, The products of the study displayed that there was a significantly
difference increase in iron level among thalassemia and control patients. There was a significantly difference
between males and females with iron level. The increase in iron overload and delayed growth was evident in
thalassemia patients in a study conducted in Sri Lanka Karunaratna et al 2017 (16). Thalassemia is a disease of
the blood that causes a large annihilation of RBCs, which lead to anemia (17). The results showed that a Drop
the level in Hb, PCV among thalassemia patients and control and significant difference (p≤0.05) of them(in
male and female) table(2). This is agreed with research in the Mosul city, where it was found that the level of
Hb and PCV less in patients than control (Sharaf et.al,2006) (18) and Moayad (19). In another study in Nepal,
the researchers found a reduction in the level Hb and PCV of thalassemia patients (20). In our study we found an
increase in the number of white blood cells in patients with thalassemia compared to control with a population
of 7.384 ±0.821 and 9.570 ±0.988 for males and females, respectively, while red blood cells were low
in comparison with control of 1.88 ±0.08 for males and 1.865 ±0.80 for females this is consistent with a study
conducted in Babil also noted a rise in the number of
white blood cells with a decrease in red blood cells Al-Marzok and Maaroof 2017(21) in another study in Cairo university (22) where found the mean and SD for WBCs were 8.8 ±2.3 , but the other indices in form of RBCs were away from our study the values were 2.6±0.78. This is close to the results we have obtained.

Conclusions

We concluded that liver enzymes are increased in thalassemia illness, such as WBCs and iron, while Hb, PCV and RBCs are lower in patients, and male patients are more affected by the disease than females, while ESR is not affected in patients comparative with healthy people.

Acknowledgment: We thanked and appreciated all patients who agreed to take blood samples from them and helped us conduct our research.

Ethical Clearance: A formal permission taken from responsible of thalassemia Center in Maternity and Children’s Hospital in Babylon, Iraq.

Source of Funding: Self.

Conflict of Interest: Nil.

References

4- Galanello Renzo, Origa Raffaella, Beta-thalassemia. Orphanet J Rare Dis, p. 5-11,2010.


20- Sherchand O, KC. R, Majhi S, Lamsal M, Baral N. Laboratory parameters of B-thalassaemia minor patients visiting BPKIHS as diagnosed by Agarose Gel Electrophoresis Journal of Institute of Medicine, April, 2013; 35:1,28-31


Performance Analysis of Indonesian Public Hospitals:
A Panel Data Method

Jon Hendri Nurdan¹, Sjafrizal², Hefrizal Handra², Hardisman Dasman³

¹Student of Doctoral Program of Public Health Sciences, Faculty of Medicine, ²Department of Economic Studies, Faculty of Economics, ³Department of Community Medicine and Public Health, Faculty of Medicine, Andalas University, Padang, Indonesia

Abstract

Balanced Score Card approach to health sector organizations measures performance based on financial and non-financial aspects which are divided into four perspectives, namely customer perspective, business and internal process perspectives, learning and growth perspectives, and financial perspective. The study uses a quantitative approach with panel data regression analysis. Panel data is used to analyze the hospital performance with balanced scorecard approach in Indonesian public hospitals, based on patient satisfaction, service quality, human resources competencies and cost efficiency. Data analysis used the cross section data of 14 public hospitals in Indonesia and the time series data from 2015 to 2017 so that there are longitudinal data as many as 42 data. Based on the results of panel data regression analysis concluded that significantly patient satisfaction, service quality, human resources competencies and cost efficiency affect the hospital performance and they are the critical success factors of hospital performance with balanced scorecard approach in Indonesian Public Hospital.

Keywords: Health Sector Organization, Balanced Scorecard, Hospital Performance

Introduction

Kaplan in 2001 states that balanced scorecard approach could be used in health sector organizations and non-profit organizations with the modification of balanced scorecard according to the characteristics of the organization itself. Modifications to balanced scorecard are very necessary because organizational characteristics in the private sector and public sector are different where the private sector prioritizes financial perspectives.¹,²

Balanced scorecard approach has been used in many health service sectors, both profit and non-profit, including: a) Hospitals; b) Health Service System; c) University Hospital / Department of Health; d) Long-term Services; e) Center for Mental Health; f) Pharmacy Services; g) Health Insurance Company.³

Hospitals as public service institutions must to implement a performance management that is oriented to patient satisfaction. Indonesia public hospitals must be able to create superior performance or performance excellence, as well as hospitals as providers of health services through the provision of services in accordance with service standards. One of the strategies carried out by hospital managers in increasing patient satisfaction is service quality.⁴

The central public hospitals as one of the government agencies must be able to provide accountability to the government and the community as service users. Therefore there needs to be a performance measurement that covers all aspects. Balanced scorecard is the right choice for measuring performance from both financial and non-financial aspects.⁴

Balanced Scorecard approach to public sector organizations measures performance based on financial and non-financial aspects which are divided into four perspectives, namely customer perspective, business
and internal process perspectives, learning and growth perspectives, and financial perspective. Financial perspective looks at performance from the point of view of profitability in achieving financial targets, so it is based on sales growth, return on investment, operating income, cash flow, and cost efficiency. Customer perspective is based on patient satisfaction, customer profitability, customer retention, and market share. Business and internal process perspectives identify critical factors in the organization's internal processes by focusing on developing new processes that are customer needs. Service efficiency, service effectiveness and service quality are things that must be developed and improved to achieve the goals of increasing value for customers and stakeholders. learning and growth perspective measures factors related to technology, development of human resources, systems and procedures, and other factors that need to be updated. (4)

Research conducted by Aurora seeks to implement balanced scorecard for use in public sector organizations. The results of the study indicate that performance measurement using balanced scorecard is better than using traditional performance measurements. Balanced scorecard is deemed appropriate to be used as a tool to measure public sector performance because it not only emphasizes the quantitative-financial aspects, but also considers the qualitative and non-financial aspects. This is in line with the objectives of the public sector which places profits not only as a key performance measure, but services that tend to be qualitative and non-financial. (4)

The Mackay Memorial Hospital in Taiwan shows that balanced scorecard approach is useful in order to sharpen its competitive advantage. It helps to take a more strategic approach that would differentiate services and attract more business. Balanced scorecard approach also improve collaboration and communication between all levels of key stakeholders and staff. (5)

Hogland Hospital in Swedia also uses balanced scorecard as a tool to measure financial control and service quality improvement, along with human resources developments. At first, balanced scorecard was used as a two-year trial but continued because of the success of the trial. (6)

This study aims to analyze the hospital performance with balanced scorecard approach in Indonesian public hospitals, based on patient satisfaction, service quality, human resources competencies and cost efficiency.

Method

This study uses a quantitative approach with panel data regression analysis to determine factors that affect hospital performance with balanced scorecard approach in Indonesia public hospital. Data analysis used the cross section data of 14 public hospitals in Indonesia and the time series data from 2015 to 2017 so that there are longitudinal data as many as 42 data.

Data used for analysis is secondary data in the form of government agency performance accountability report, annual report, business strategy plan, and budget business plan from 2015 to 2017 at Indonesian Public Hospital. The following are described in the stages of this research.

Results

Panel data regression analysis in this study is used to analyze several variables that affect the hospital performance based on four perspectives of balanced scorecard, which is based on previous theory and the results of previous studies. The independent variables used in panel data regression analysis in this research were patient satisfaction, service quality, human resources competencies and cost efficiency during 2015 to 2017.

Hospital performance variable is proxied from the percentage of hospital performance achievement figures based on indicator of public service agency. Patient satisfaction is proxied from the ratio of community satisfaction index assessment results divided by the maximum scale of the community satisfaction index value. Service quality are proxied from the ratio of each indicator of service timeliness, namely outpatient waiting time, emergency response time, length of stay, waiting time for radiology services, waiting time for laboratory service, waiting time before surgery, and speed of prescription services for finished drugs. Human resources competencies is proxied from the ratio of the number of hospital human resources divided by the number of human resources according to the hospital’s minimum service standard. Cost efficiency is proxied from the ratio of PNPB income divided by operating costs. Data used in this study are time series data for three periods (2015-2017) and cross section data as many as 14 RSUP. So that the longitudinal data is 42 data.
One of the requirements in panel data regression analysis is that data must be met with normal elements. Data that is not met by normality, usually due to data that has extreme values or outliers or is also commonly used in terms of outliers. The purpose of this normality test is as a tool to see whether the standardized residual values on the model are normal or not. To find out, it can be seen with most of the standardized residual values approaching the mean.

Normality test in this study was carried out by using the graph method and histogram with Jarque-Bera test. Dependent variable is the average value of hospital performance depicted in the graph as the vertical axis. The horizontal axis shows standardized residual values. To see whether the distribution of data found to be normal or not is seen from the value of Jarque-Bera and its probability value. Data is not normally distributed if the statistical test results obtained p-value <0.05. Whereas, if the statistical test results obtained p-value > 0.05 then data is normally distributed. Based on the statistical test results, Jarque-Bera value is 0.625919 and p-value is 0.731280 (> 0.05), it can be concluded that data is normally distributed and panel data regression analysis can or is feasible.

Regression equations can be estimated using three models, namely Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). Common effect model and fixed effect model are estimated using panel least squares method, while random effect model is estimated using GLS method. Of the three models, one of the more appropriate models will be chosen to be used in analyzing the factors that influence the hospital performance using balanced scorecard approach in Indonesian public hospitals. Which approach estimation model will be used in analyzing the factors that influence the hospital performance with balanced scorecard approach in Indonesian public hospitals depending on the results of model selection. The selection of this model is done by testing the model using Chow test, Hausman test, and Lagrange Multiplier (LM) test.

Table 1: Regression Model for Performance Analysis of Indonesian Public Hospital with Random Effect Model

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable: Hospital Performance (HP)</th>
<th>Koef. Regression</th>
<th>t-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constants (C)</td>
<td>0.153505</td>
<td>1,205712</td>
<td>0.2380</td>
<td></td>
</tr>
<tr>
<td>Patient Satisfaction (PS)</td>
<td>0.119777</td>
<td>2,062061</td>
<td>0.0486*</td>
<td></td>
</tr>
<tr>
<td>Service Quality (SQ)</td>
<td>0.013752</td>
<td>2,112694</td>
<td>0.0437*</td>
<td></td>
</tr>
<tr>
<td>Human Resources Competencies (HRC)</td>
<td>0.045950</td>
<td>3,054089</td>
<td>0.0049*</td>
<td></td>
</tr>
<tr>
<td>Cost Efficiency (CE)</td>
<td>0.110867</td>
<td>2,321495</td>
<td>0.0278*</td>
<td></td>
</tr>
<tr>
<td>F-Statistic</td>
<td>16,2536</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob (F-Statistics)</td>
<td>0.0001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coefficient of Determination (R²)</td>
<td>0.698968</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Redundant fixed effect test/chow test shows that the probability of cross-section chi-square is 0.0003 (<0.05), it can be concluded that the most appropriate model used between common effect and fixed effect is fixed effect.

Correlated random effect test/hausman test shows that the probability of cross-section random is 0.3478 (>0.05), it can be concluded that the most appropriate model used between fixed effect and random effect is random effect.

Omitted random effect test/lagrange multiplier test shows that the probability of cross-section breusch-pagan is 0.0017 (>0.05), it can be concluded that the most appropriate model used between common effect and random effect is random effect. Based on chow test and hausman test, it can be concluded that the most appropriate model used for panel data regression analysis in this study is random effect model.

Model that has been prior to analysis is conducted prior classical assumptions underlying panel data regression model in order to obtain a model that is efficient, visible and consistent. With the Random Effect model selected, it is not relevant to do the Classic Assumption test. This is because the Random Effect model uses the estimated Generalized Least Square (GLS) method. GLS technique can overcome
the time series autocorrelation and correlation between observations (cross section). GLS method produces an estimator to fulfill the Best Linear Unbiased Estimation (BLUE) characteristic which is a treatment method to overcome violations of heteroscedasticity assumptions and autocorrelation.

Goodness of fit test in this study consisted of three tests. There are F-statistic, t-statistic and coefficient of determination. F-statistic test was conducted to determine whether the independent variables in the overall significantly affect the dependent variable.

Based on Table 1, the probability of F-statistic is 0.0001 (<0.05). It can be concluded that the regression model is used to explain the effect worthy of patient satisfaction, service quality, human resources competencies and cost efficiency of the hospital performance. t-statistic test was done to see how far the influence of independent variables individually explain the variations of dependent variable. Table 5 shows that patient satisfaction (p=0.0486), service quality (p=0.0437), human resources competencies (p=0.0049), and cost efficiency (p=0.0278) significantly affect the hospital performance.

Coefficient of determination test was conducted to measure that the independent variables in the regression model was able to explain the dependent variable. Table 1 shows that the value of R^2 is 0.698968, it means patient satisfaction, service quality, human resources competencies and cost efficiency has an influence on the proportion of hospital performance by 69.90%. Indeed, 1.57% is influenced by other variables that are not in the regression model.

The regression equation (1) indicates that HP is the hospital performance, PS is patient satisfaction, SQ is service quality, HRC is human resources competencies and CE is cost efficiency.\( \beta_0 \) is the regression coefficient constants, \( \beta_1 \) is the regression coefficient of patient satisfaction, \( \beta_2 \) is the regression coefficient of service quality, \( \beta_3 \) is the regression coefficient of human resources competencies and \( \beta_4 \) is the regression coefficient of cost efficiency. \( t_0 \) is the t-statistic constants, \( t_1 \) is the t-statistic of patient satisfaction, \( t_2 \) is the t-statistic of service quality, \( t_3 \) is the t-statistic of human resources competencies and \( t_4 \) is the t-statistic of cost efficiency.

\[
HP = \beta_0 + \beta_1 \times PS + \beta_2 \times SQ + \beta_3 \times HRC + \beta_4 \times CE
\]

(1)

\[
HP = 0.153505 + 0.119777 \times PS + 0.013752 \times SQ + 0.045950 \times HRC + 0.110867 \times CE
\]

(2)

The regression equation (2) means that for any increase in patient satisfaction indicator by 1 if the other variable is assumed to remain, the hospital performance will increase by 0.119777. Any increase in service quality indicator by 1 if the other variable is assumed to remain, the hospital performance will increase by 0.013752. Any increase in human resources competencies indicator by 1 if the other variable is assumed to remain, the hospital performance will increase by 0.045950. Any increase in cost efficiency indicator by 1 if the other variable is assumed to remain, the hospital performance will increase by 0.110867.

Discussion

Ramon-Jeremino et al. shows that the balanced scorecard would allow a proper monitoring and tracking system for the main healthcare indicators. This contributes to a better control in comparison with standards that are associated with adequate quality assistance. It is necessary to adapt the balanced scorecard to the specific characteristics of the clinical field, redefining both perspectives and indicators.(7)

Chang and Wu examined the implementation of the Balanced Scorecard in hospital cases in Taiwan. In order to improve its competitive position, hospitals began implementing the Balanced Scorecard in 2001. This was the first hospital to implement the Balanced Scorecard in the health system in Taiwan and one of the few successful implementations. The hospital is a pioneer in implementing the Balanced Scorecard.
for health organizations in Taiwan. Furthermore, the implementation of the Balanced Scorecard in hospitals is for all entities, not just for certain departments. The implementation of the Balanced Scorecard is initiated and evaluated through four sequential phases, which take a complete eight years. By identifying the determinants of success, it can overcome some serious challenges and difficult conditions faced by the Balanced Scorecard that will be implemented. (5)

Edward et al. began examining trends from 29 key performance indicators over a period of 5 years (2004-2008). The findings show that the Balanced Scorecard was successfully used to increase the capacity of the health and service systems through the performance of benchmarking over a 5-year research period. The most important thing is that the use of the Balanced Scorecard helps to show the effects of investment, facilitates policy changes, and culture-based decision making in the primary health care system in Afghanistan. Furthermore, the researchers reminded that the continued success of the Balanced Scorecard in Afghanistan will greatly depend on the ability to accommodate all changes in existing health system policies. (8)

Edward et al. also stated that significantly there was an increase in the domain of patient and community satisfaction with services with p <0,0001. There was also a significant increase in the service quality domain from 2004-2008 with p <0,0001. The availability of drugs, equipment, clinical guidelines, laboratory use, and knowledge of service providers and training shows a significant increase since 2004. (9)

According to Bitner argues that perceived service quality is the result of a comparison of performance and received by consumers from service providers. (9) Oliver and Burke state that overall service quality is determined by the suitability of desires that result from a comparison of wants and performance perceived by consumers. Quality services will create satisfaction for service users who can ultimately provide benefits, including harmonious relationships between service providers and customers, providing a solid basis for repurchase, and creating customer loyalty. (10)

Conclusion

Patient satisfaction, service quality, human resources competencies and cost efficiency affect the hospital performance significantly and they are the critical success factors of hospital performance with balanced scorecard approach in Indonesian Public Hospital.

Conflict of Interest Statement: The authors declare that there is no conflict of interest.

Ethical Clearance: Research ethics approval was obtained from the Faculty of Medicine, University of Andalas Padang, granted number 352/UN.14.2/KEP/2018.

Source of Funding: The study was funded by Center of Standardization and Continuous Education of Indonesian Ministry of Health of Indonesia and The Government of Bengkulu Province.

References

Evaluation of Platelet Rich Fibrin Effect in the Bone Density after Teeth Extraction by Cone Beam Computed Tomography

Kamal Saheb Mezal¹, Sahar Shakir Al-Adili², Ali S. Al-Haddad²
¹Ministry of Health, Karbala Hospital, Karbala, Iraq, ²College of Dentistry, University of Baghdad, Baghdad, Iraq

Abstract

Background: Platelet Rich Fibrin (PRF) favors the development of microvascularization and is able to guide epithelial cell migration to its surface. This material acts as a biodegradable scaffold that consists of an autologous leukocyte-platelet-rich fibrin matrix composed of a tetramolecular structure, with cytokines, platelets, cytokines and stem cells within it. This work hypothesis is that the platelet rich fibrin increase the bone density after teeth extraction.

Objective: Examine the role of platelet rich fibrin in healing of extraction socket.

Method: 36 participants with an age range from 20-52 years old. The participants divided into two groups, the study group was treated with PRF in the socket after teeth extraction while the control group conducted without PRF. Both groups had simple non-traumatic teeth extraction. The preparation of the PRF include 5 ml of blood centrifuged at 3000 rpm for 10 min, then gently sutured the socket after putting the PRF clot to minimize the suturing effect on the healing process. After 4 months, the new-bone density formed in the socket was measured by Cone beam computed tomography (CBCT).

Result: Maximum and mean density was significantly higher in the study group compared to control, the bone density in upper jaw was significantly higher in study group compared to control, the bone density in upper jaw was significantly higher in study group compared to control.

Conclusion: Platelet Rich Fibrin show better healing effect and increase in bone density compared to standard of care

Keywords: platelet rich fibrin, CBCT, done density, teeth extraction, jaw

Introduction

Maxillofacial reconstruction, oral implants, regenerative procedure etc. are highly dependent on successful regeneration and healing and one of great challenges faced in clinical research in development of bioactive surgical additive regulating inflammation and increasing healing. Bone regenerative techniques including graft material, protein and barrier membrane are used to improve the bone quality. Healing in tissue is mediated by of signaling proteins. Understanding of this process at microcellular level is still not complete, but it is proven fact that platelets do play an important role in wound healing. In order to limit the inevitable alveolar ridge resorption many different bone substitutes have been proposed for ridge preservation, but their placement functions as a double-edged sword; it is effective in limiting ridge resorption, but it delays healing in the socket.

Due to increasing patients demands for timely and esthetic treatment there is a need for new therapeutic protocols that accelerate the healing of post-extraction sockets while minimizing the duration of the treatment. Platelet rich fibrin had shown promising role in bone regeneration in the socket after tooth extraction.
Autologous platelet preparations have shown promising results in bone regeneration in the post-extraction socket\(^6\). Autologous platelet has newly attracted the interest of medical research because of its simplicity of provide as well as promising effect from its medical application\(^7\). Platelet rich fibrin was developed originally in France by Choukroun et al. in 2000, it is considered as a second-generation of platelet concentrate, which characterized as a new step of the therapeutic idea of platelet gel that aims to collect platelets, leukocytes and the released cytokines in a fibrin clot. Platelet rich fibrin is widely used to accelerate hard and soft tissue healing. The PRF preparation is a simple protocol made by centrifugation of natural blood without any additives\(^8\). The hypothesis of this study is based on the ability of local application of PRF to increase the bone density and accelerated bone healing.\(^9\)

**Method**

**Study design**

The study included 36 participants with an age range from 20-52 years old. The participants divided into two groups, the study group was treated with PRF in the socket after teeth extraction while the control group conducted without PRF. Both groups had simple non-traumatic teeth extraction. The study carried out from 1st of January 2017 to end of December 2017.

**PRF preparation**

The preparation of the PRF include 5 ml of blood centrifuged at 3000 rpm for 10 min, then gently sutured the socket after putting the PRF clot to minimize the suturing effect on the healing process. After 4 months, the new-bone density formed in the socket was measured by Cone beam computed tomography (CBCT).

**Data collection**

The following data was collected from each patients: age, gender, and bone density

**Statistical analysis**

Anderson darling test was done to assess if continuous variables follow normal distribution, and data presented using their mean and standard deviation used, Discrete variables presented using there number and percentage, chi square test used to analyze the discrete variable. Two samples t test used to analyze the differences in means between two groups (if both follow normal distribution with no significant outlier), Mann Whitney U test used to analyze the differences between two groups (if they do not follow normal distribution). SPSS 22.0.0 (Chicago, IL), Prism version 8.00 for Windows (GraphPad Software, La Jolla California USA), software package used to make the statistical analysis, p value considered when appropriate to be significant if less than 0.05

**Results**

There was no significant difference in age, gender of the participants, as illustrated in table 1.

<table>
<thead>
<tr>
<th>Table 1: Assessment of demographic data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Age (years), mean ± SD</td>
</tr>
<tr>
<td>Gender, n (%)</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>

Maximum and mean density was significantly higher in the study group compared to control, as illustrated in table 2.

<table>
<thead>
<tr>
<th>Table 2: Assessment of bone density according to groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Maximum, mean ± SD</td>
</tr>
<tr>
<td>Minimum, mean ± SD</td>
</tr>
<tr>
<td>Mean, mean ± SD</td>
</tr>
</tbody>
</table>

Since data did not follow normal distribution Mann Whitney U test used

The bone density in upper jaw was significantly higher in study group compared to control, as illustrated in table 3.
Table 3: Assessment of bone density in upper jaw

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Study</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>9</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Maximum, mean ± SD</td>
<td>742.7 ± 194.6</td>
<td>1,188.7 ± 377.0</td>
<td>0.007</td>
</tr>
<tr>
<td>Minimum, mean ± SD</td>
<td>-283.0 ± 148.5</td>
<td>10.1 ± 184.1</td>
<td>0.017</td>
</tr>
<tr>
<td>Mean, mean ± SD</td>
<td>196.1 ± 154.7</td>
<td>409.3 ± 227.1</td>
<td>0.034</td>
</tr>
</tbody>
</table>

Since data did not follow normal distribution Mann Whitney U test used

No significant difference in bone density between study and control in lower jaw, as illustrated in table 4.

Table 4: Assessment of bone density in lower jaw

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Study</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>10</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>Maximum, mean ± SD</td>
<td>812.0 ± 278.7</td>
<td>997.3 ± 493.1</td>
<td>0.427</td>
</tr>
<tr>
<td>Minimum, mean ± SD</td>
<td>-337.9 ± 232.3</td>
<td>-319.6 ± 132.7</td>
<td>0.821</td>
</tr>
<tr>
<td>Mean, mean ± SD</td>
<td>176.1 ± 211.1</td>
<td>216.6 ± 183.2</td>
<td>0.326</td>
</tr>
</tbody>
</table>

Since data did not follow normal distribution Mann Whitney U test used

Discussion

Nowadays the dentist facing challenge in how accelerate the bone regeneration in the alveolar ridge preservation after teeth extraction. Since years numerous allografts, alloplastic or xenografts are used for this purpose. They include bone substitution such as hydroxyl apatite, freeze dried bone grafts demineralized bone grafts, bio active glass etc. These bio active materials have good osteoconductive and osteoinductive properties, but unpredictable result several a time and the risk of disease transmission, led to explore of the materials which can produce predictable regeneration or can improve the properties of these bioactive graft materials.

The results of the current study indicated that there was high bone density formed in the socket of study group as compared to the control after 4 month by CBCT because the Maximum density was significantly higher in the study group (1,076.1±446.6) compared to control (779.2±238.6), also Mean density was significantly higher in study group (295.9±218.6) compared to control (185.6±181.7) this lead to biological effect of PRF as sole graft. This was in agreement to the results obtained in previous studies conducted by shrivastava et al. 2018 that state on there was early osseous bone regeneration in the PRF groups at a given points of time in mandibular as well as in maxillary in both sexes.

Many clinical studies suggest that the mixture the growth factors contained PRF and PRP with bone graft may be suitable to enhance bone density.

The biological properties of PRF contain several growth factors (BDGF, TGF-beta, EGF, VEGF, IGF-1, beta-FGF, and HGF) obtained with a simple centrifugation procedure, to stimulate several biological functions such as chemotaxis, angiogenesis, proliferation, differentiation, modulation, thereby presenting a possible therapeutic device for a more rapid and effective regeneration of hard and soft tissue.

Study limitation

Only one reading in the bone density post extraction socket needed further reading at different intervals, assessment the bone density by CBCT only, small sample size, and the reason of teeth extraction only dental caries, tooth fracture, orthodontic treatment.

Conclusion

Platelet Rich Fibrin show better healing effect and increase in bone density compared to standard of care

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by College of dentistry, University of Baghdad.

Source of Funding: The work were supported by authors only

References


Hashim Fawzi Dabbas¹, Safa Tayeh Muhemmed²
¹Assist. Prof. Dr., ²Prof. University of Kufa / College of Administration and Economics, Republic of Iraq.

Abstract

The future-ready strategy has been proposed in the literature and has been widely used in management practice as a useful tool to help the effective implementation of an organization’s strategy. This article examines some of the most relevant strategies, in the specific context of the Iraqi private healthcare organizations, and how can use to improve the healthcare performance. The study instrument was the questionnaire, the main conclusion indicates the positive effect of future-ready strategy development on healthcare performance.

Keywords: Environmental Scanning, Strategic Thinking, Strategic Decision Making, Strategic Planning, Evaluating.

Introduction

From time immemorial, Iraqi private hospital has been offering good and unique services amid the presence of the public hospitals which poses competitive pressure to this private hospital. According to (Hilfi et al., 2013)¹, they stated that the health systems in Iraq are undergoing a lot of transformations which requires hospitals and especially private hospitals to conform to these requirements which entail: demographics, emerging diseases, the high costs of healthcare and the overall rise in the operating costs in terms of hiring experienced doctors and nurses². This, therefore, shows that in order to operate without any problems, there is a need for a private hospital to adopt a strategy so that it can save its costs of operations and quality³, due to this external pressure, it is, therefore, necessary to challenge other hospitals using various ways and one being the use of strategy⁴.

The current number of physician staff and the distribution of healthcare services in the country are no longer at its optimum¹. The nature of services offered at different healthcare facilities have also been reported to be not standardized⁵. The facilities in the country are not networked and the country’s referral systems are still wanting⁶. Recent studies have shown that primary health care in the country lack quality it deserves, with personnel lacking adequate training in quality improvement⁶. Most healthcare authorities in the country indicate that the quality of healthcare could still need improved. The good conditions that currently characterize comprehensive health care force the system with a strategic focus to maintain and improve these conditions so that Iraq can access health indicators similar to those of developed countries⁷. In this regard, the Iraqi government is working hard to achieve improved health performance in the country, and the private health sector has found a great foothold to provide health service.

Accordingly, the purpose of this study is to highlight future strategies that can be developed and implemented in order to improve the health sector in Iraq. The paper seeks to investigate specific measures to be taken by the government to promote not only primary health care but also other levels of care in the country and the use of private hospitals and clinics and improve their performance.

Literature Review

Future Ready Strategy

(Cowley & Domb, 2012)⁸, states that strategy is

Corresponding author:
Safa Tayeh Muhemmed
E-mail: tayehsafaa@gmail.com,
hashimf.dabbas@uokufa.edu.iq
a method, a way or plan to achieve the desired goal, solution to a problem or what the firm desires with ease. To be relevant in the healthcare industry, Iraqi hospitals, therefore, had to come up with strategy so as to sustain itself in this industry. Although there are many factors that hinder the provision of the health care services, the idea of using a strategy to maneuver this problem is a great move for the private hospital. Moreover, the private hospital should come up with different strategies so that they don’t over-rely on the common strategies that other hospitals they compete with, are engaging the same strategies.

Future Ready Strategy includes:

Environmental Scanning (ES)

Environmental scanning is the acquisition and use of information about events, trends, and relationships in an organization’s external environment, the knowledge of which would assist management in planning the organization’s future course of action. The planning of healthcare requires information from internal and external sources to enable make the appropriate decision. it is critical and hence what is promoted should be within the needs of the locals and attainment of the outcome needed.

Strategic Thinking (ST)

Strategic thinking is a reflective process that determines the intention and strategic profile of what an organization wants to become. Its objective is to seek the ability to anticipate events, visualize a destination and build it, and reach the future that is considered most convenient for a person, society, company or nation. It is responsible for determining the future prospects of a company while establishing the basis on which all planning decisions will be made.

Strategic Decision Making (SD)

When talking about strategy in companies, it refers to choosing and making decisions, to compete and to be sustainable over time. Thus, the capacity for strategy is assimilated to think with strategy, to reflect in an orderly manner in search of preventing bad decisions for the viability of the future of the organization. This capacity for decision making allows having clarity about the objectives.

Strategic Planning (SP)

Strategic planning is an organizational or institutional administration activity that is used to set priorities, focus energy and resources, strengthen operations, employees and other stakeholders toward common goals, established agreements to generate intended outcomes or results. The planning also encompasses assessing and adjusting the organization’s direction in response to a changing environment.

Evaluating (EV)

Evaluate the result of the decisions and actions is not a confrontational action, it is an allied process that contributes to increasing the possibility of success of the organization. Evaluating involves comparing what have planned against the actual results obtained; For this reason, in order to evaluate correctly, it is necessary to plan correctly and follow up frequently on the objectives set and the strategies defined.

Accordingly, Figure 1 shows the dimensions.

Figure: Future Ready Strategy Dimensions

Source: (Conway, 2016)

Healthcare Performance (HP)

Performance is an important factor for the quality of any organization. It is especially important for the health sector, As it is required to provide quality health services to the society, because providing health service to society is one of the biggest challenges faced by health sector management. Healthcare performance is featured on the management style adopted by the hospitals, and the number of platforms developed or modified for the patients.
Material And Method

Sampling

The target population of the research consists of the customer of the private hospitals and clinics in Iraq. It is difficult to identify the actual number of private clinics and hospitals, because there is no very accurate statistic, therefore the sample was selected randomly and we have got 319. Sampling design which the process is undertaken to come up with the sample to be investigated was therefore necessary. The response rate is 87% and it considered highly adequate for analysis because it was above 70% which is recommended as adequate by Mugenda(2008). Cronbach alpha was used in this study to determine the reliability of the measures and its exceed 0.70.

Research Hypothesis

After review of the literature, the conceptual framework was formulated in Figure 2 to discuss the hypotheses as follows:

H1: The future ready strategy has a positive relationship on healthcare performance.

H2: The future ready strategy has a significant positive effect on healthcare performance.

Factor Analysis

In order to identify the components of the variables, the confirmatory factor analysis is performed. As it shown in Table 1 the confirmatory factor analysis exceed 0.5 and refer to that the items relating to each factors of future ready strategy and healthcare performance.

Table 1. Factor Loadings

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor</th>
<th>Loading</th>
<th>Item</th>
<th>Factor</th>
<th>Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item_1</td>
<td>ES</td>
<td>0.653</td>
<td>Item_21</td>
<td>EV</td>
<td>0.605</td>
</tr>
<tr>
<td>Item_2</td>
<td></td>
<td>0.634</td>
<td>Item_22</td>
<td></td>
<td>0.601</td>
</tr>
<tr>
<td>Item_3</td>
<td></td>
<td>0.741</td>
<td>Item_23</td>
<td></td>
<td>0.608</td>
</tr>
<tr>
<td>Item_4</td>
<td></td>
<td>0.731</td>
<td>Item_24</td>
<td></td>
<td>0.631</td>
</tr>
<tr>
<td>Item_5</td>
<td></td>
<td>0.684</td>
<td>Item_25</td>
<td></td>
<td>0.663</td>
</tr>
<tr>
<td>Item_6</td>
<td></td>
<td>0.721</td>
<td>Item_31</td>
<td></td>
<td>0.804</td>
</tr>
<tr>
<td>Item_7</td>
<td></td>
<td>0.735</td>
<td>Item_32</td>
<td></td>
<td>0.801</td>
</tr>
<tr>
<td>Item_8</td>
<td></td>
<td>0.718</td>
<td>Item_33</td>
<td></td>
<td>0.821</td>
</tr>
<tr>
<td>Item_9</td>
<td></td>
<td>0.744</td>
<td>Item_34</td>
<td></td>
<td>0.835</td>
</tr>
<tr>
<td>Item_10</td>
<td></td>
<td>0.776</td>
<td>Item_35</td>
<td></td>
<td>0.838</td>
</tr>
<tr>
<td>Item_11</td>
<td></td>
<td>0.814</td>
<td>Item_36</td>
<td></td>
<td>0.837</td>
</tr>
<tr>
<td>Item_12</td>
<td></td>
<td>0.805</td>
<td>Item_37</td>
<td></td>
<td>0.849</td>
</tr>
<tr>
<td>Item_13</td>
<td></td>
<td>0.764</td>
<td>Item_38</td>
<td></td>
<td>0.791</td>
</tr>
<tr>
<td>Item_14</td>
<td></td>
<td>0.744</td>
<td>Item_39</td>
<td></td>
<td>0.789</td>
</tr>
<tr>
<td>Item_15</td>
<td></td>
<td>0.738</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item_16</td>
<td></td>
<td>0.774</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item_17</td>
<td></td>
<td>0.754</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item_18</td>
<td></td>
<td>0.738</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item_19</td>
<td></td>
<td>0.784</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item_20</td>
<td></td>
<td>0.770</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hypotheses Testing

Hypothesis 1

From Table 2 it can be noticed that the correlation between the two variables (FS, HP) is strong and positive (r=0.648), and the significance of this correlation revealed through T test. The calculated T value is 15.530 and accepted at (P<0.05), this result means there are a correlation between (FS,HP) which support H1 Hypothesis.

Regarding to the sub hypothesis it is appeared positive relationship between ES,HP (r1=0.518), The (T=10.771) is accepted at (P<0.05), this result support H11 Hypothesis. While the relation between ST,HP refer to positive relationship with (r2=0.541) and significant with (T=11.445) and (P<0.05) this result support H12 Hypothesis. Regarding to the H13 hypothesis it is appeared positive relationship between SD,HP (r3=0.566), (T=12.222) is accepted at (P<0.05), this result support H13 Hypothesis. While the relation between SP,HP refer to positive relationship with
(r=0.630) and significant with (T=14.462) and (P<0.05) this result support H14 Hypothesis. Finally the relation between EV,HP also refer to positive relationship with (r=0.669), (T=16.018) is accepted at (P<0.05), this result support H15 Hypothesis.

Table 2. Correlation Hypotheses Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variable</th>
<th>r</th>
<th>T</th>
<th>Sig.</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>FS</td>
<td>0.648</td>
<td>15.530</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H11</td>
<td>ES</td>
<td>0.518</td>
<td>10.771</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H12</td>
<td>ST</td>
<td>0.541</td>
<td>11.445</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H13</td>
<td>SD</td>
<td>0.566</td>
<td>12.222</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H14</td>
<td>SP</td>
<td>0.630</td>
<td>14.462</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H15</td>
<td>EV</td>
<td>0.669</td>
<td>16.018</td>
<td>0.000</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Hypothesis 2

According to the result of Table3, observed that the regression analysis indicates that the constant effect is (B0=1.348), and the value of the regression coefficient (B1=0.574) means that there is an effect of (0.574), and the value of the coefficient of determination was (R2=0.420) that means the model explains (42%) of the variance of independent variable. The model is significant depending on the value of F test at level (P<0.05) and this result supports H2 hypothesis.

Regarding to the sub hypothesis it is appeared positive effect between ES,HP. The value of the constant effect (B0=1.514), the regression coefficient (B1=0.464), the model explains (26.8%) from the variance of HP, and the model was significant (P<0.05), which is accepted. This result supports H21 hypothesis. In accordance with the results, it was observed that there is a positive effect of ST on HP, the regression analysis indicates that the constant effect value is (B0=1.728), and the regression coefficient (B1=0.428), the model interprets (29.2%) from the variance of HP. The model is significant depending on the value of the F test and the significance value (P<0.05). This result supports H22 hypothesis. Also, The results show a positive effect of SD on HP, the value of the constant effect (B0=1.792), the regression coefficient (B1=0.420), the model explains (32%) from the variance of HP, and the model was significant (P<0.05). This result supports H23 hypothesis. In accordance with the results, it was observed a positive effect of SP on HP, the regression analysis indicates that the constant effect value is (B0=1.646), and the regression coefficient (B1=0.481), the model interprets (39.8%) from the variance of HP. The model is significant depending on the value of the F test and the significance value at the level of (P<0.05). This result supports H24 hypothesis. Also, The results show a positive effect of EV on HP, the value of the constant effect (B0=1.457), the regression coefficient (B1=0.550), the model explains (44.7%) from the variance of HP, and the model was significant (P<0.05). This result supports H25 hypothesis.

Table 3. Regression Hypotheses Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variable</th>
<th>B0</th>
<th>B1</th>
<th>R²</th>
<th>F</th>
<th>Sig.</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2</td>
<td>FS</td>
<td>1.348</td>
<td>0.574</td>
<td>0.420</td>
<td>229.142</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H21</td>
<td>ES</td>
<td>1.514</td>
<td>0.464</td>
<td>0.268</td>
<td>116.016</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H22</td>
<td>ST</td>
<td>1.728</td>
<td>0.428</td>
<td>0.292</td>
<td>130.981</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H23</td>
<td>SD</td>
<td>1.792</td>
<td>0.420</td>
<td>0.320</td>
<td>149.381</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H24</td>
<td>SP</td>
<td>1.646</td>
<td>0.481</td>
<td>0.398</td>
<td>209.154</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H25</td>
<td>EV</td>
<td>1.457</td>
<td>0.550</td>
<td>0.447</td>
<td>256.112</td>
<td>0.000</td>
<td>Supported</td>
</tr>
</tbody>
</table>
According to the multivariate regression it is appeared form Table 4 there are three significant relations with the dimensions (SD, SP, EV), which has (B3=0.180, B4=0.213, B5=0.419), with two not significant relations with the dimensions (ES, ST), which indicates that with multiple regression ES and ST will have no significant effect on HP.

Table: 4 Multivariate regression Testing

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Variable</th>
<th>B0</th>
<th>B1</th>
<th>R2</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H21</td>
<td>ES</td>
<td></td>
<td>0.107</td>
<td></td>
<td>0.079</td>
<td></td>
</tr>
<tr>
<td>H22</td>
<td>ST</td>
<td></td>
<td>0.057</td>
<td></td>
<td>0.380</td>
<td></td>
</tr>
<tr>
<td>H23</td>
<td>SD</td>
<td>1.23</td>
<td>0.180</td>
<td>0.479</td>
<td>57.593</td>
<td>0.015</td>
</tr>
<tr>
<td>H24</td>
<td>SP</td>
<td></td>
<td>0.213</td>
<td></td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>H25</td>
<td>EV</td>
<td></td>
<td>0.419</td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Iraq has undergone decades of war and unwavering sanctions from the United Nations. For example, Power failure grids as a result of the Gulf War in the 1990s and a decade of sanctions were among the side effects on the hospitals and water; sanitary installations on which it depends on sufficient electricity supply. Additionally, Long power interruptions that are still common can be extremely damaging, especially during the hot summer months. The hindering factors to the adequate growth of private hospitals are inadequate facilities such as electricity, peace and stability among the residents. After decades of war tension and fear of the unknown lacks behind the minds of many people dwelling in Iraq. For instance, the fighting against terrorism has a big effect on the health sector, the facility needs enough resources to be functional. Therefore, failure of the government to restore the national grid on time is a challenge amid the rising number of medical service demand. These conditions have affected the provision of logistical and financial capabilities; Therefore, the private healthcare sector has emerged as a competitive alternative, requiring effective strategic tools. Many studies ensure that it is beyond doubt that there is indeed a need to bridge the knowledge gaps by examining the relation between future ready strategy and the performance. Basic medicines have often been unavailable in various hospitals in the country. As a result, the mortality rate, more also the infant mortality rate has more than doubled. Unless some drastic measures are undertaken to improve the situation in the country, Iraq’s health care sector is likely to worsen even further. More focus should be placed on how to provide essential facilities like basic sanitation, essential drugs and immunization services. The country should also focus on improving the general level of satisfaction among healthcare customers.

Conclusions

As discussed above, it can be seen that the five strategies have a positive effect on the dependent variable healthcare performance and therefore hospital management should at all means try to make good use of these future ready strategies. It is appeared that hospitals and clinics should use future ready strategies to increase their performance. About 60% of these strategies were found to be competing favorably which clearly shows that the three strategies are prudent issues as far as performance concerned.

Ethical approval: Official agreement was obtained from the university of kufa, college of administration, ethical committee of researches

Conflict of Interest: Authors declared: None.

Source of Funding: Self-Funding.

References


Incidence of Rota Virus as a Causative Pathogen in Iraqi Children Infected by Diarrhea

Samir S. Raheem¹, Mohammed M.M. Alomari¹, Nawar J.H. Al-Salih¹
¹Collage of Veterinary Medicine, University of Al-Muthanna, Iraq

Abstract
Rotavirus infection is common, particularly during the cooler months, among infants and children 1 to 24 months of age. Older children and adults can also be affected, but attack rates are usually much lower. Outbreaks among elderly, institutionalized patients have also been recognized. Rotaviruses appear to localize primarily in the duodenum and proximal jejunum, causing destruction of villous epithelial cells with blunting (shortening) of villi and variable, usually mild, infiltrates of mononuclear and a few polymorphonuclear inflammatory cells within the villi. In developing areas of the world, diarrhea is a significant cause of death in infants. It is estimated that young children in developing countries experience 1.5 billion episodes of diarrhea and 4 million associated deaths each year. Approximately 15% of children in developing nations die of diarrhea before 3 years of age, in United States 20-35 million episodes of diarrhea occur in every year, resulting in 2.1 to 3.7 million physician visits. In addition, an average of 220,000 children younger than 5 years of age with diarrhea are hospitalized and approximately 125 deaths are occurring each year, (Hospitalized and outpatient care for pediatric diarrhea result in direct costs of more than $2 billion per year with additional indirect costs to families. Aim of the study to evaluate the role of the Rota virus as a causative pathogen in Iraqi children less than two years of age suffered from diarrhea. A stool samples from 360 children suffered from diarrhea with less than 5 years of age were subjected for detection of Rota virus, using an antigen reagent ((a suspension of polystyrene latex particles of uniform size coated with immunoglobulin directed specifically against rotavirus antigen obtained from the simian rotavirus strain SA-11)). Samples were collected during the period from December 2017 to march 2018 from out and inpatients related to Al-Mansour teaching hospital in Baghdad. A 15 case out of 360 represent 4.16% diarrheal infected children majority below 6 months of age were founded to be positive for Rota virus test, all cases reported in September and October. Rota virus represents a considerable and significant pathogen in diarrheal infected children in Iraq and results in a morbidity and mortality in addition to financial loss.

Keywords: Rota virus, diarrhea, children

Introduction
Rotavirus infection is common, particularly during the cooler months, among infants and children 1 to 24 months of age. Older children and adults can also be affected, but attack rates are usually much lower. Outbreaks among elderly, institutionalized patients have also been recognized. Rotaviruses appear to localize primarily in the duodenum and proximal jejunum, causing destruction of villous epithelial cells with blunting (shortening) of villi and variable, usually mild, infiltrates of mononuclear and a few polymorphonuclear inflammatory cells within the villi. In developing areas of the world, diarrhea is a significant cause of death in infants. It is estimated that young children in developing countries experience 1.5 billion episodes of diarrhea and 4 million associated deaths each year. Approximately 15% of children in developing nations die of diarrhea before 3 years of age, in United States 20-35 million episodes of diarrhea occur in every year, resulting in 2.1 to 3.7 million physician visits. In addition, an average of 220,000 children younger than 5 years of age with diarrhea are hospitalized and approximately 125 deaths are occurring each year, (Hospitalized and outpatient care for pediatric diarrhea result in direct costs of more than $2 billion per year with additional indirect costs to families. Aim of the study to evaluate the role of the Rota virus as a causative pathogen in Iraqi children less than two years of age suffered from diarrhea. A stool samples from 360 children suffered from diarrhea with less than 5 years of age were subjected for detection of Rota virus, using an antigen reagent ((a suspension of polystyrene latex particles of uniform size coated with immunoglobulin directed specifically against rotavirus antigen obtained from the simian rotavirus strain SA-11)). Samples were collected during the period from December 2017 to march 2018 from out and inpatients related to Al-Mansour teaching hospital in Baghdad. A 15 case out of 360 represent 4.16% diarrheal infected children majority below 6 months of age were founded to be positive for Rota virus test, all cases reported in September and October. Rota virus represents a considerable and significant pathogen in diarrheal infected children in Iraq and results in a morbidity and mortality in addition to financial loss.

Keywords: Rota virus, diarrhea, children

Introduction
Rotavirus is a double-stranded RNA, 65-75 nm, naked, double-shelled capsid. Usually incomplete, 5 serotypes important to humans, Duodenum, jejunum, Mechanism of immunity Local intestinal IgA, Epidemic or sporadic, Seasonality Usually winter, primarily affected Infants, children <2 years old, Method of transmission Fecal–oral, Incubation period 2-3(days), The human intestinal rotaviruses were first found in 1973 by electron microscopic examination of duodenal biopsy specimens from infants with diarrhea. Since then, they have been found worldwide and are believed to account for 40% to 60% of cases of acute gastroenteritis occurring during the cooler months in infants and children less than 2 years of age¹. Worldwide, at least 500,000 childhood deaths annually are attributed to rotavirus infections; whereas such deaths in the United States are rather infrequent, the annual morbidity rate has been nonetheless considerable in recent years. Recent introduction of vaccines for routine use may reduce their impact in the future. These viruses have been detected in intestinal contents and in tissues from the upper gastrointestinal tract².

In Iraq according to the information obtained from the biological statistics department in “Iraqi Ministry of Health”, the numbers of mortality of children under
“5” years of age suffering from diarrhea was as the following:

In 2001 the total number was 715340 children and the mortality number was 149 cases.

In 2003 the number was 303217 children and the mortality number was 144 cases.

In 2004 the total number was 897441 and the mortality number was 411 cases.

The mortality numbers without stable curve, in 1998 the number was 464, in 1999 was 456 whereas in 2000 the number was 244 cases.

The usual clinical syndrome is characterized by various combination of nausea, vomiting, abdominal cramps, and diarrhea, fever and dehydration also may be present, occasionally, systemic manifestation occur including bacteremia and immune-mediated extra intestinal manifestations of enteric infections, diarrhea and malnutrition related with, contribute in the past decades in children mortality in the Uruguay which reach to (120) for each (1000) newborn².

The causative agents of diarrhea include bacteria, virus, and parasites, E. coli considered as significant etiology of diarrhea in children in addition to Rota virus which cause 40% of diarrheal cases in children under ‘2’ two years of age, many children under school age infected by diarrhea caused by Shigella sonni and parasites³. Diarrhea still as a major cause of life threatening infections in addition that it’s the second ranking to respiratory system infections in mortality cases in poor countries.

**Material and method**

**Kits:**

1 - Agglutinating antisera for rotavirus. Rapid qualitative test for the direct detection of rotavirus group antigen in feces by agglutination of latex particles on slide. Manufactured by (Biokit – Spain).

**Serologic test for Rotavirus:**

Principle of Rotavirus test according to manufacturer (Biokit Spain):

The antigen reagent is a suspension of polystyrene latex particles of uniform size coated with immunoglobulins directed specifically against rotavirus antigen obtained from the simian rotavirus strain SA-11. Latex particles allow visual observation of the antigen – antibody reaction. When placed in contact with a sample containing rotavirus antigen. The uniform appearance of the latex suspension will convert to a clear agglutination. This change occurs because rotavirus antigen contained in the feces reacts with the specific immunoglobulins coated onto the latex particles, forming a web between them.

**Reagents:**

1 - Antigen reagent: Suspension of polystyrene latex particles coated with rabbit anti-rotavirus immunoglobulins in buffer. 2 -Control reagent: Suspension of polystyrens latex particles coated with non-immune rabbit immunoglobulins in buffer.

Positive control: Suspension of inactivated simian rotavirus antigen (SA-11).

Diluent.

**Procedure of rotavirus test:**

**A – Test performed in feces:**

A centrifuge tube was labeled for each sample to be tested. ~a 2ml of diluent was dispensed into each tube. 0.2g (0.2ml) of fecal specimen was added to each tube. Each tube was vortexed to obtain a homogenous suspension. All tubes stood for (5-10) minutes at room temperature. Then centrifugation of each tube for (10 min.) at 1000 G and Proceeding with assay using supernatant.

**B - Test performed from swab:**

A centrifuge tube was labeled for each sample to be tested. 2 ml of diluents was dispensed in each tube. The swab was immersed in the diluent, rolling it against the walls of the tubes to insure adequate dispersion of sample. Wringing the swab out above the liquid level by rolling it against the walls of the tube until all liquid has been expressed from swab, each tube vortexes to obtain a homogenous suspension. Then tubes were stand (5-10) min. room temperature, centrifuged for 10 min. at 1000 G. Proceeding with assay using supernatant.

Then allowed the reagent to reach room temperature. The reagents were shacked well to disperse and suspend the latex particles in the buffer solution. 5 0 µl of each supernatant was placed onto one section of the slide, and 50 µl onto another adjacent section. Adding
one drop of antigen reagent next to the sample in the first slide section and one drop of control reagent next to the sample in the second section. Using a separate stirrer, mix contents of both sections and spread over the entire surface of the slide section. Rotating the slide for 2 minutes manually or on a rotary shaker set at 60-80 r.p.m. observing for agglutination.

**Results**

Out of 360 cases of tested stool samples a fifteen 4.16% positive cases for Rota virus was detected as shown in the table below

**Table (1): Number and percentage of rotavirus positive patients.**

<table>
<thead>
<tr>
<th>No. of samples</th>
<th>(+ve) Rotavirus test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>(360) Stool sample</td>
<td>15</td>
</tr>
</tbody>
</table>

The children under six month of age were the most infected age group. And the male were more exposed to be infected than female. As it appear in the table below.

**Table (2): Distribution of diarrheal infections according to age groups.**

<table>
<thead>
<tr>
<th>Age group (months)</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>0-6</td>
<td>8</td>
<td>2.3</td>
</tr>
<tr>
<td>7-12</td>
<td>4</td>
<td>1.1</td>
</tr>
<tr>
<td>13-18</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>19-24</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>4.1</td>
</tr>
</tbody>
</table>

The most infected age group was ranged between (0-6) months represented by eight 2.3%.

**Table (3): Distribution of cases according to gender**

<table>
<thead>
<tr>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>9</td>
<td>60</td>
<td>6</td>
</tr>
</tbody>
</table>

The present study revealed male 60% exposure to infection higher than female 40%

**Discussion**

A large number of studies have shown the important role of rotavirus as a cause of diarrhea in children in developed in addition to the developing countries 4, 5, 6, 7, 8, 9 and 10. Most of the cases occur in children less than 5 years of age as in table (2) that’s may be due to low tite of antibodies in their body to viral antigens. In addition to the age distribution of rotavirus infection, many studies have indicated a higher ratio of infected males table (3) to infected females 8, 11, 12, 13. This pathogen infects not only children but also adults14, and rotavirus infection may occur repeatedly in humans from birth to old age15. In the present study, a clear seasonal pattern in rotavirus diarrhea was seen peaked during the winter months, from September to December. There is wide range of diversity in the opinion between exerts and scientists about how to face the rotavirus diarrheal infection; some of them recommend to use vaccination as a priority to control the epidemiology others suggest to use the traditional management by replacement of the fluids and electrolytes in addition to emphasis on the hygiene and sanitation and hand washing in addition to the most important factor which is the breastfeeding.

**Conflict of Interest:** None

**Funding:** Self

**Ethical Clearance:** Not required.

**References**


Bladder Injury as a Complication of Cesarean Deliveries And Peripartum Hysterectomy

Naghm K. Tayeh¹, Nada Kadhum Kareem², Hayder Adnan Fawzi³

¹Department of Gynecology and Obstetrics, Fatima Al-Zahraa Administrative hospital, Baghdad, Iraq, ²Department of Gynecology and Obstetrics, Al-Mahaweel General Hospital, Babylon, Iraq, ³Baghdad Medical City, Baghdad Teaching Hospital, Clinical Pharmacy Department, Baghdad, Iraq

Abstract

Objective: review the incidence of iatrogenic bladder injuries (IBI) in obstetrical procedures and to identify the risk factors for these injuries.

Materials and Method: a retrospective research involve all patients that had cesarean deliveries (CS) and peripartum hysterectomies at Fatima Al-Zahraa Administrative hospital, from the 1st of January 2015 till the 30th of September 2018.

Results: A total of 35,212 CS performed during the study period, 68(0.19%) CS and peripartum hysterectomies were complicated by bladder injury of them 41% were type 1, 53% were type 2, and 6% were type 3 complications. Adhesions documented in 73%, while 12% had placenta accreta and 15% had ruptured uterus. Elective CS performed in 47% of the cases. Most cases of IBI occurred during reflection of bladder flap 56% and are mainly in type 1 and type 2 while 30% occurred during delivering the baby. All cases of type 3 (6%) occurred during opening the peritoneum.

Conclusion: bladder injury is a rare complication of cesarean delivery and peripartum hysterectomy but knowledge of the obstetrical, surgical and anatomical factors that can predispose to injury is the key to prevention.

Keywords: cesarean delivery, iatrogenic, bladder injury, adhesion, complication

Introduction

Cesarean section is the most frequently performed obstetrical surgery in the world and their number are increasing every year. The reduced rate of morbidity and mortality to the mother during cesarean section are noticeable over the last century but there is a growing number of urological complications during cesarean sections due to anatomical proximity of urinary tract and genital tract predispose them to iatrogenic trauma during obstetric surgery. Bladder injury has been reported to occur 0.27% in primary cesarean deliveries and 0.43%-0.81% in repeated cesarean deliveries. During repeated cesarean deliveries two surgical challenges are often encountered; that the bladder is densely adherent to lower uterine segment, and might have healed in position much higher on the uterus, thereby blocking access to lower uterine segment.

During emergency lower segment cesarean section for placental abruption or fetal distress bladder injury might occur because of visualization and dissection of each surgical procedure less than optimal. In cesarean deliveries of protracted second stage, the vagina rather than the lower uterine segment might be incised because of difficult identifying the interface between uterus and vagina resulting in an increased risk of bladder injury. Placenta accreta may penetrate posterior bladder wall causing injury to the bladder. When uterus ruptures, shearing force transmitted to the bladder there by cause bladder injury.

Iatrogenic bladder injury associated with significant short and long term morbidity and potential complications include prolonged operative time, urinary tract infection, prolonged indwelling catheterization time and although very rare, visicouterine and vasicovaginal...
fistula. The best management of this pathology is prevention of several predisposing conditions, it had been identified and surgeon should be aware of these risk factors of bladder injury immediate recognition and repair yields better results.

Method

This study represented a single institutional experience of iatrogenic bladder injury during cesarean deliveries and peripartum hysterectomy at the department of obstetrics and gynecology at Fatima Al-Zahraa administrative hospital from the 1st January 2015 till the 30th of September 2018, during the study period the total number of cesarean deliveries was 35,212. Sixty eight of those patients developed bladder injuries and were enrolled in this study. All patients had detailed history taken and clinical examination performed. Iatrogenic bladder injury is identified as full thickness accidental incision of bladder wall which need immediate repair.

Information collected about age, parity, previous pelvic surgeries, the stage of labor, timing of delivery (elective, urgent, or emergent) and concurrent uterine rupture or placental accreta. Timing of delivery was defined as elective if the surgery was scheduled or urgent if surgery needed to be performed in timely manner, or emergent if delivery was immediate emergency. Operative information collected about the presence of adhesions; through retrospective review we researched the site, size, etiologic characteristics, and time of injury.

According to the complexity of injuries it was categorized the patients into three types:

Type 1: simple tear in the dome or anterior wall of the bladder.

Type 2: dome injury complicated by vertical extension either in lateral or posterior bladder wall.

Type 3: those with incision of both anterior and posterior walls of the bladder through which the baby had been delivered.

In all cases with IBI, the senior obstetrician consulted a duty urologist who would thoroughly assess the extent of bladder injury, look for associated ureteric injuries intra-operatively. The bladder defects are sutured in two layers with absorbable sutures and the integrity checked by distending the bladder. Wound drainage is mandatory, Foley catheter is kept for (7-28) days according to the case. Cases with major bladder repair were followed up by the concerned urologists and fully revealed at our center. During follow up, patients underwent ultrasonography, retrograde pylogram or voiding cystogram to assess their urinary tract before declaring cured. No cases with associated ureteric injuries or complicated by fistula.

Statistical analysis was carried was using chi square analysis for discrete variables, the 95%CI of the prevalence was calculated using the formula:

\[ p \text{ (1 - p) } \times \frac{z}{\sqrt{n}} \]

In which \( p \) = prevalence of the disease, \( q = 1 - p \), \( z \) is normal score distribution, \( \alpha = 95\% \), \( n \) = total sample size.

GraphPad Prism version 8.0.0 for Windows, GraphPad Software, San Diego, California USA, software package used to make the statistical analysis, p value considered when appropriate to be significant if less than 0.05.

Results

Bladder injury is a rare complication of cesarean deliveries, in the current study there were 35,212 cesarean deliveries of them 68 cases had IBI, and the rate of injury was 1.93 per 1,000 CS (95%CI: 1.89 – 1.98 per 1,000). The age range from 19-43 years old for women with IBI with mean age 30 years.

Results according to the type and complexity of the bladder injury as following:

Type 1: 28 cases (41%) had simple tear to the dome or anterior wall of the bladder

Type 2: 36 cases (53%) had dome injury complicated by vertical extension either in lateral or posterior bladder wall

Type 3: 4 cases (6%) had incision of both anterior and posterior walls of the bladder through which the baby had been delivered.

Table 1 illustrate the association between various variables and type of IBI.
Table 1: association between different variables and IBI type

<table>
<thead>
<tr>
<th>Variables</th>
<th>IBI type</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type 1</td>
<td>Type 2</td>
</tr>
<tr>
<td>Size of IBI, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2 cm</td>
<td>2 (7.1%)</td>
<td>14 (38.9%)</td>
</tr>
<tr>
<td>2 – 6 cm</td>
<td>21 (75.0%)</td>
<td>18 (50.0%)</td>
</tr>
<tr>
<td>&gt;6 cm</td>
<td>5 (17.9%)</td>
<td>4 (11.1%)</td>
</tr>
<tr>
<td>Etiology and type of IBE, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adhesion</td>
<td>25 (89.3%)</td>
<td>21 (58.3%)</td>
</tr>
<tr>
<td>Placenta accreta</td>
<td>0 (0.0%)</td>
<td>8 (22.2%)</td>
</tr>
<tr>
<td>Rupture uterus</td>
<td>3 (10.7%)</td>
<td>7 (19.4%)</td>
</tr>
<tr>
<td>Type of CS, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>17 (60.7%)</td>
<td>15 (41.7%)</td>
</tr>
<tr>
<td>Urgent</td>
<td>4 (14.3%)</td>
<td>8 (22.2%)</td>
</tr>
<tr>
<td>Emergent</td>
<td>7 (25.0%)</td>
<td>13 (36.1%)</td>
</tr>
<tr>
<td>Stage of labor, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No labor</td>
<td>25 (89.3%)</td>
<td>11 (30.6%)</td>
</tr>
<tr>
<td>Stage 1</td>
<td>3 (10.7%)</td>
<td>9 (25.0%)</td>
</tr>
<tr>
<td>Stage 2</td>
<td>0 (0.0%)</td>
<td>16 (44.4%)</td>
</tr>
<tr>
<td>Time of creating the damage to the bladder, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening of the peritoneum</td>
<td>1 (3.6%)</td>
<td>5 (13.9%)</td>
</tr>
<tr>
<td>Reflection of bladder flap</td>
<td>13 (46.4%)</td>
<td>25 (69.4%)</td>
</tr>
<tr>
<td>Delivery of baby</td>
<td>14 (50.0%)</td>
<td>6 (16.7%)</td>
</tr>
</tbody>
</table>

Discussion

In this study 35,212 CS were carried out in the center; accidental cystotomy however occurred in 68 cases (0.19%) which is corresponding with the reported incidence that ranged between 0.27% to 0.81% of cesarean deliveries. In the current series, the most common type of bladder injury was type 2 where the injury affect the dome and extended to the posterior or lateral wall followed by type 1 and then type 3. According to the size, in 23% of cases the size of the injury were <2 cm which could be repaired by the obstetrician and may be sutured by single layer, while 14 cases (20%) are of type
2 where the injuries extended posteriorly or laterally so the urologist were involved in repair.9.

The most common cause of IBI was dense bladder adhesion, during repeated cesarean deliveries. In the existing study adhesion was the most common cause of IBI and was responsible for 73% of the cases, and all cases of type three bladder injury caused by adhesion. The pathogenesis of adhesion is a complex process in which fibrin, coagulation factors, and inflammatory cells repairing the peritoneum so preventing the risk factors for development of adhesion includes: infections, excessive tissues manipulations, increased blood loss during surgery, adhesiolysis, and tissue ischemia.2,5. Thus the best approach is prevention of injury by careful sharp dissection and limitation of blunt dissections.2.

A cesarean hysterectomies performed for severe bleeding from Placenta accreta were associated with IBI in 12% of the cases, and all the cases were type 2 so in these instances, an expert multi-professional team is essential to minimalize neonatal and maternal morbidity and mortality throughout planning elective operations.5,8. When the uterus is ruptured, shearing force may be transmitted to the bladder causing direct injury, in our results it occurred in 15% of the cases and there were all in type 1 and type 2.10.

IBI occurred more with elective cesarean sections (35%) of cases due to the fact that elective cesarean delivery were carried for patients of at least one cesarean or in older patients. followed by emergent CS and all cases of type 3 IBI (6%) occurred with emergent CS during opening the peritoneum, which reflect the stressful nature of the operation so despite the emergency situation, the surgeon should be aware of the risk of IBI, and proceed in controlled manner to limit the chance of bladder injury.2. The timing of cesarean delivery during either the first verses second stage of labor also has impact, the risk of damage to the urinary bladder and the extend of this injury is increased in the second stage compared to the first stage due to the fact that the pressure of fetal presenting part changes the local blood supply to the bladder wall rendering it more vulnerable to injury, also it is difficult to distinguish the edge of the lower uterine segment and the bladder.2,8.9.

Time of bladder injury occur during reflection of bladder peritoneum in 56% while 30% during delivery of the baby the station of fetal presenting part deeper or equal to +1 hinders its extraction, promotes damage to the lower uterine segment which often coexist with damage to the bladder. All cases of type 3 bladder injury occur during opening peritoneum.6,8.

One of the most distress injuries that can occur during surgery to an individual is bladder injury which can have serious implications going forward if not identified in timely fashion. It is important to understand that most bladder injuries are preventable, identifiable and treatable. Such an injury is recognizable complication of hysterectomy or cesarean section procedures; however, if an immediate repair is carried out the potential fistula issue can be avoided. There was no evidence of consecutive complications of bladder dysfunction in our patients. In this study we do skipped several limitations including that bladder injury may be grossly underreported in the medical reports we were not relied on the medical coding to identify bladder injury moreover medical reports reviews also bring out inherited bias in reporting on risk factors. It is important that we study and understand the complications associated with cesarean deliveries and particularly with repeated cesarean delivery. We believe that our data have important implications for counseling patients regarding elective cesarean deliveries, thus women planning large families should consider the risk of repeated cesarean delivery.5

Conclusion

Bladder injury is a rare complication of cesarean delivery and peripartum hysterectomy but knowledge of the obstetrical, surgical and anatomical factors that can predispose to injury is the key to prevention.7

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by Gynecology & Obstetric department of Fatima Al-Zahraa Administrative hospital.

Source of Funding: The work were supported by authors only

References

1. Betran AP, Ye J, Moller AB, Zhang J, Gulmezoglu AM, Torloni MR. The Increasing Trend in


The Spatial Perception as an Connotation to the Performance Level of the Forward Repel Blow of the Badminton

Hisham Hindawi Howaidi¹, Asaad Ali Safih¹, Alaa Abdul Sada Mohammed¹
¹College of Physical Education and Sports Sciences, Al-Qadisiya University, Iraq

Abstract

The research has contained several axes and it has been emphasized on the axis of measurement of spatial cognition in the research sample and its connection with to the level of performance of the skill of front repel blow of the badminton whereas a test was constructed to measure the cognitive skill of each member of the sample , also the researcher used Luay Al-Bakri’s test to measure the level of skill performance of the front-end blow. After the tests were completed, the statistical results were extracted which showed that there is a significant correlation between the level of spatial cognition and the level of skillful performance of badminton players.

Keywords: Spatial perception, skill.

Introduction

It is possible to consider the badminton game as a sporting event spread all over the world for the ease of its requirements in terms of space, tools and practiced from all age groups as amateur and professional anyone can play the game and even enjoy it without having a little background about this game,¹ Special skill performance and a wide range of abilities and skills, especially mental ones, because the mind occupies a large place because of the small play space and speed of performance and maneuver that may be faced by the opponent, which requires the player to interact mentally and employ all skills associated with creativity.

The consciousness is one of the important issues dealt with in the psychology of study and research as it is the fundamental pillar of human life in practice, mental, and is the basis for the process of knowledge and is shared with all other mental processes of perception, imagination and thinking, providing it with the necessary and necessary information is the main pillar in the success of any human effort, whether theoretical or practical effort applied science,² and the cognitive has a number of the varieties and forms the most important the spatial perception which means sense of the repel of objects, any length and width and the height and depth and its position left, right and we use so many connotations that enable us to understand the spatial aspects arrangements of things in the outside world and thus helps us visual perception.³ The level of skillful performance of most sports activities in general and badminton in particular is closely related to the use of possible mental processes associated with the same skill.

The study aims to:

Recognition of the relationship between spatial cognition and the level of skill performance of the skill (front repel blow) through:

1- Identifying the level of spatial cognition in the research sample.

2. Measuring the level of skill performance.

The advantage of the study:

Knowledge of the contribution rate and the variable correlation (spatial perception) at the level of skill performance and include tests to measure spatial perception and level of skillful performance.

The scientific achievement:

Here Manifested the importance of research in accessing the database of the sample through knowing the relationship of spatial cognition to the level of skillful of badminton players and the inclusion of measures that measure the ability of spatial cognition and the level of performance of the skill (front repel blow) in this field. It
could be considered also one of few also a few attempts to study these aspects in the field of sports and especially badminton.

The practical part:

The Field research procedures:

The researchers have used the descriptive method in the correlative relationships style to suitability and the nature of the research. The researchers chose the sample from the study community in a random stratified manner represented by students of the third grade of college of Physical Education and Sports Sciences / Al-Qadisiyah University with 150 students and 30 students were selected as a sample divided equally on (15) for both gender.

Tests and Metrics:

1- The spatial perception test.

2 - Test the level of the performance skillful of the forward repel blow of badminton.

First: The spatial perception test:

The researcher divided the badminton field from the tested side to (5) vertical rows and (5) horizontally to form transparent squares with a length of 1.5 meters and a width of 1.20 meters in amount (25) square. In order to show the level of difficulty in the test, the researcher neglected the first five squares close to the network to become (20) square and at the start of the test assistant to throw the transmitter to the laboratory and during the maintenance between the laboratory and the assistant, The arbitrator orders (stop) The tested immediately closes its eyes and raises its head to the top and asks for the column number (1-5), the horizontal row number of (1-5) and the square number of (1-20) according to the base and count (5) score for each correct answer and deduct its score whenever the answer moves away by one number from the correct answer and three attempts are given to each examiner then collected and divided into.

Second: Test the level of performance of the blow to the front:

The researcher made a reference to the examined player’s place and divide the stadium into four zones for falling the badminton starting from the area (3) points and at a distance of (50) cm after the back line of the square and then the area of (5) points which is the area between the back line of the square and the beginning of the remote doubles transmitter line at a distance (76) cm followed by the area of (4) points and the occurrence after the remote pairing line at a distance of (70) cm followed by the area of (2) point between the area of (4) points which is located after the remote doubles transmission line and by distance of (70) cm followed by the area of (2) points which sited between the area of the (4) points and ends in the imaginary line down the rope and when sending the badminton to the tested by the assistant, the tested blows the badminton to forward repel blow and send it over the network and rope, the points are calculated where it falls in any place of the four regions, no points are given if the badminton falls off the field or under the rope, 12 attempts are given and counted the best (10) tries to the maximum limit of the attempts (50) points.

The scientific foundations of the tests:

The researchers designed and constructed a test that could measure spatial cognition in the research sample, the researchers keen to test in the badminton court and during the performance of the frontal shocks to match the research requirements for which the test was set up. In order to ensure that the test is suitable for use and according to scientific foundations, the researchers extracted the empirical basis for the test (honesty, consistency and objectivity) by conducting an exploratory experiment on a sample from the outside of the research sample and from the same community to learn about the pros and cons of the tests that the researcher may encounter during work in order to obtain a good measure of honesty and consistency.

The researchers also used a test (Loay Bakri) to measure skill blow forward for badminton.

Validity: One of the most important characteristics of the standard of the scale agreed by specialists in the measurement of psychological integrity and reliability, depending on the accuracy of data or grades obtained from the psychological standards.

The researchers used a questionnaire for referees with experience and specialization in the fields of psychology, tests, measurement and badminton. The number (10) to take their views in terms of validity of the test to measure the skill of spatial perception and modify what they see fit. The test was approved by the
current status of all ten experts. as shown in table (1).

Table (1) shows the validity of the tests

<table>
<thead>
<tr>
<th>No.</th>
<th>Test</th>
<th>Number of arbitrators</th>
<th>Fit</th>
<th>Not fitting</th>
<th>K2 Value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The spatial perception</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0.001565</td>
</tr>
<tr>
<td>2</td>
<td>Skills of front repel</td>
<td>10</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>0.001565</td>
</tr>
</tbody>
</table>

Stability: The fixity stability means that if the same subjects are re-tested under the same conditions and variables, it gives the same conditions and variables, and it gives the same results or may be close (8). To extract the stability of the test, the researchers used the test and retest method on a survey sample consisting of (10) tested of both gender, 5 males and 5 females, under the same conditions and timing. The first test of spatial cognition took place on 17/12/2018, (24/12/2018). The test of the forward blow was performed on (18/12/2018) and the test was repeated on (25/12/2018). The coefficient of statistical stability was calculated by extracting the simple correlation coefficient Pearson and the correlation was high between the two tests, Stability is also high, as shown in the following table:

Table (2) shows the coefficient of correlation of test stability

<table>
<thead>
<tr>
<th>No.</th>
<th>Test</th>
<th>Medium 1</th>
<th>Medium 2</th>
<th>Deviation 1</th>
<th>Deviation 2</th>
<th>stability</th>
<th>Correlation square</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The spatial perception</td>
<td>11.696</td>
<td>11.695</td>
<td>1.035688</td>
<td>1.138608</td>
<td>0.8151</td>
<td>0.664388</td>
</tr>
<tr>
<td>2</td>
<td>Level of performance</td>
<td>31.8</td>
<td>31.9</td>
<td>9.542886</td>
<td>8.359293</td>
<td>0.962189</td>
<td>0.925808</td>
</tr>
</tbody>
</table>

Main experience: After the confirmation of the validity of the tests and solid scientific foundations .The researchers conducted the main experiment on a sample of (30) tested of both gender and 15 males and 15 females. The spatial cognition test was conducted on the sample on 2/1/2019, 3/1/2019). After the results were unpacked and statistically computed, the results were significant by the effect of the spatial cognition skill on the forward repel blow.

The statistical means:

The statistical program was used spss.

Results and discussion

After the researchers emptied the results of the main tests and processed statistically and for the purpose of evaluating the performance of the skills of spatial perception and frontal repel blow od badminton which has been analyzed data using the statistical bag (spss) (9), and the results have been shown to a significant correlation between the skill spatial perception and level The performance of the front-end trampoline skill, Table (3) and (4) show this.
Table (3) shows the statistical results of the spatial cognition test of the sample

<table>
<thead>
<tr>
<th>No.</th>
<th>mean</th>
<th>Hypothesis Average</th>
<th>Differences average</th>
<th>standard deviation</th>
<th>Standard error</th>
<th>Calculated t value</th>
<th>Degree of freedom</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>11.83</td>
<td>11.5</td>
<td>0.33</td>
<td>1.88</td>
<td>0.34</td>
<td>0.96</td>
<td>29</td>
<td>0.34</td>
</tr>
</tbody>
</table>

Table (4) shows the statistical results to test the level of skill performance

<table>
<thead>
<tr>
<th>No.</th>
<th>mean</th>
<th>Hypothesis Average</th>
<th>Differences average</th>
<th>standard deviation</th>
<th>Standard error</th>
<th>Calculated t value</th>
<th>Degree of freedom</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>35.53</td>
<td>36</td>
<td>0.00333</td>
<td>8.24</td>
<td>1.50</td>
<td>0.002</td>
<td>29</td>
<td>0.998</td>
</tr>
</tbody>
</table>

The researchers then set the standard levels of the skill performance of the sample and through the followed scientific methods, and thus the researchers achieved the second goal of the research and thus the test has a good standard characteristics and in order to facilitate the procedures were presented in a table and as follows:

Table (5) shows the levels, the achieved number and the achieved percentage to test the level of skill performance:

<table>
<thead>
<tr>
<th>NO.</th>
<th>Label for level</th>
<th>Term</th>
<th>the achieved number</th>
<th>achieved Percentage</th>
<th>mean</th>
<th>standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very low</td>
<td>22-27.6</td>
<td>6</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Low</td>
<td>-33.2</td>
<td>7</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Average</td>
<td>-38.8</td>
<td>7</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>High</td>
<td>-44.4</td>
<td>4</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Very high</td>
<td>-50</td>
<td>6</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It has been shown that the mean of the sample is located in the central region the sample is of average level, the researchers attributed this to the fact that the sample are students of the Faculty of Physical Education and sports sciences and not players clubs or teams. In order to achieve the third goal of the research the researchers have extracted the results of a multiple correlation between the (cognitive and performance) of the variable input ratio questionnaire with the performance level, the results show that there is a correlation between the spatial variable and the performance level, as in Table (6).

The researchers attribute that correlation to the fact that the badminton game is individual and fast-acting needed a great mental abilities to achieve better performance and down to the achievement of those processes are the skill of spatial cognition where it requires, the skillful player must always be aware of his existential position within the arena and distance and proximity to the network so that he can maneuver and deceive the opponent and counter rapid and multi-directional opponent strikes and diversification, in the exercise of the skill forms they will have the ability to recognize the stimuli.
Table (6) shows the percentage of contribution of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Connection</th>
<th>Contribution Ratio</th>
<th>Modified Share Rate</th>
<th>Calculated F Value</th>
<th>Degrees of Freedom</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance level</td>
<td>35.5333</td>
<td>8.24928</td>
<td>0.66</td>
<td>0.438</td>
<td>0.397</td>
<td>10.540</td>
<td>2-27</td>
<td>0.000</td>
</tr>
<tr>
<td>Spatial perception</td>
<td>11.8303</td>
<td>1.88111</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Since the percentage of the contribution has been shown to the researchers, they have shown the predictive value of the variables and the proportion of their correlation with the level of performance,\(^{10}\) as in Table (6) where through this equation we can know the proportion of performance of students or players and labs by entering the laboratory data test spatial perception to show us what the result His skill level with the frontal impact of the plane feather according to the predictive equation.\(^{11}\)

**Conclusions**

That of spatial perception percentage of the contribution of the correlation between the level of skill performance for badminton players in general and for the skill of blow forward in particular being a particularly important mental skill with quick individual games we can predict the level of skill performance for players through their cognitive level.

The researchers recommend the trainers and teachers to pay attention to the development of the skill of spatial recognition of badminton players through training to train the skill of spatial awareness and enhance the trainees, which reflected positively on the level of skill performance of players.

**Ethical Clearance** - Taken from Al-Qadisiya University committee

**Source of Funding** - Self

**Conflict of Interest** - None

**References**

1- Amin Anwar Al-Khouli: Badminton, Cairo, Dar Al-Fikr Al-Arabi, 1994.
5 - Dhafer Hashim Al-Kazemi: practical applications for writing messages and educational and psychological messages, Beirut, Dar al-Kuttab al-Alami, 2013.
9- Wadih Yassin and Hassan Mohammed Al-Obaidi: Statistical Applications in Physical Education

Echocardiographic Stigmata in the First Attack of Acute Rheumatic Fever as a Major Criterion for the Diagnosis of Rheumatic Carditis in Misan, Iraq

Khalid Obaid Mohsin¹, Hussein Fadhil Musa Aljawadi², Esraa Abd Al-Muhsen Ali²

¹Head of Internal Medicine Department, College of Medicine, Misan University, Misan, Iraq, ²Assistant Professor, Pediatrics Department, College of Medicine, Misan University, Misan, Iraq

Abstract

Background: Doppler Echocardiography facility is usually available in the most areas of the world and its routine use in the initial diagnosis of rheumatic heart disease may promote early detection, much earlier that clinical examination does.

Objectives: To evaluate the utility of Doppler Echocardiography for the diagnosis of carditis in patients whom clinical examination did not indicate any evidence of carditis.

To describe the spectrum of cardiac abnormalities in patients with primary episode acute rheumatic fever.

Patients and Method: A cross sectional and prospective study conducted during a period of five years in Misan province (South East Iraq). Referred patients for an echocardiographic evaluation in Al-Sader Teaching Hospital with diagnosis of acute rheumatic fever as first attack were selected. All patients were examined clinically then subjected to Doppler Echocardiographic evaluation in the first 48-72 hours of acute phase and 2 weeks later.

Results: A total of 36 patients with median age of 13±4.69 years and male predominance were presented with diagnosis of primary attack of acute rheumatic fever. The majority were presented with migratory polyarthritis (80.6%) and clinical carditis (44.4%). Clinical carditis was found in 16/36 patients while the remaining (20 patients) had no clinical carditis. On the other hand, Doppler Echocardiography confirmed the diagnosis of carditis in additional 10 cases without clinical carditis.

About almost all patients with acute rheumatic carditis (25/26) had mitral valve /aortic valve thickness >4mm. Valvular regurgitations were constituted the major manifestation; mitral regurgitation was found in the majority (21/26 patients) followed by aortic and tricuspid regurgitation.

Conclusion: Doppler Echocardiography is more sensitive than a clinical assessment in the detection of carditis in patients with an initial attack of acute rheumatic fever. It is a useful method in identifying the subclinical mitral and aortic valvular disease when carditis cannot be detected clinically. Therefore, it is reasonable and valuable to support the addition of echocardiographic stigmata of rheumatic carditis to the current diagnostic criteria as an isolated major criterion by itself for the validation of rheumatic carditis with subclinical carditis.

Keywords: Rheumatic fever, carditis, echocardiography, Misan, Iraq.

Introduction

Acute rheumatic fever (ARF) is a common serious public health problem in the developing countries (¹). Despite the decline in its incidence in Europe and
North America with the tremendous progress made in cardiology, ARF is still forming a major healthcare concern for the vast majority of the populations in the world including children, adolescent, and young adults (1, 2, 3, 4).

Rheumatic heart disease (RHD), the sequel of ARF, is a very common cause of cardiovascular morbidity and mortality, as well as, the predominant indication for cardiac surgery in the developing countries (1, 5).

At 2001, World Health Organization (WHO) reported that a clinical examination is still the basis of the diagnosis of ARF and carditis, and the role of an echocardiographic study is considered supportive. However, an Echocardiography/Doppler examination should be used if the facilities are available (5).

In addition, the WHO reported that an involvement of echocardiography to detect valvular regurgitation and confirm the diagnosis of subclinical rheumatic carditis is still controversial (5).

Moreover, different studies showed that the inclusion of imaging study of echocardiography into Jones criteria cannot be justified unless long term results of prospective studies are available to emphasize the importance of detecting subclinical rheumatic carditis in treatment and prognosis (6, 7).

Nowadays, Doppler Echocardiography facility is usually available in the most areas of the world and its routine use in the initial diagnosis of RHD may promote early detection, much earlier that clinical examination does (8). Echocardiography has been proven to be more specific and sensitive than auscultation. It can detect early evidence of valvular involvement, can confirm the presence of valvular regurgitation, and can exclude the non-rheumatic etiologies of valvular involvement (9, 10).

Consequently, in 2012, the World Heart Federation echocardiographic criteria for RHD have been developed. Three groups are identified on the basis of assessment by 2-Dimensional, continuous-wave, and color-Doppler echocardiography: definite RHD, borderline RHD, and normal. Additionally, even the morphological features of RHD, as well as, the criteria for pathological aortic and mitral regurgitations are also defined (11).

Lately, in 2015, the American Heart Association released recommendation for using echocardiography with Doppler in ARF; one of these recommendations is to assess for the presence of carditis in the absence of auscultatory findings, especially in moderate to high risk groups and whenever RHD is a possible diagnosis (12).

For these reasons, this study had arised to evaluate the utility of Doppler Echocardiography for the diagnosis of carditis in patients whom clinical examination did not indicate any evidence of carditis and to describe the spectrum of cardiac abnormalities in patients with primary episode ARF.

**Patients and Method**

A cross sectional and prospective study conducted during a period of five years from September 2010 to September 2015 in Misan province (South East Iraq).

Reflected patients for an echocardiographic evaluation in Al-Sader Teaching Hospital with diagnosis of ARF as initial attack were selected. Diagnosis of ARF in these cases was according to the revised Jones criteria (12, 13).

Total sample size was 40 patients with first episode of acute rheumatic fever, but only 36 patients came for follow-up evaluations. So the final sample size was 36 cases; male were 22 cases and female were 14 cases. Age was ranging from 6-22 years.

Initially, all patients were examined clinically at the referral time. So patients were classified into 2 groups:

- 16 cases with clinical carditis.
- 20 cases without clinical carditis.

Then all patients were subjected to Two-Dimensional Echocardiography and Doppler Color Flow (2D Echo Doppler) evaluation in the first 48-72 hours of acute phase and 2 weeks later. All patients were examined by the same specialist doctor to exclude personal variation.

Echocardiographic imaging was performed with GE machine, model vivid, version E9 following the recommendation and guidelines of using echocardiography with Doppler in ARF (11, 12).

**Exclusion criteria:** Previous history of ARF or recurrent attacks of ARF, known case of chronic RHD, and echocardiographic stigmata of chronic valvular disease (such as restricted excursion or doming of valve leaflets or significant mitral or aortic stenosis). In addition, any case rejected to be involved in this study...
or did not complete the follow-up evaluations was excluded.

The study protocol was reviewed; ethical approval and official permission were obtained from Ministry of Higher Education, College of Medicine in Misan, Misan directorate of health and Al-Sader Teaching Hospital to carry out this study. An informed written consent was obtained from each patient or from their parents.

The analysis of data was carried out using Microsoft Excel and was presented in form of tables of numbers and percentages.

Results

A total of 36 patients with median age of 13±4.69 years and male predominance were presented with diagnosis of initial attack of ARF according to revised Jones criteria. The majority were presented with migratory polyarthritis (80.6%) and clinical carditis (44.4%) as shown in Table 1.

Clinical carditis was found in 16 patients with a first attack of ARF while the remaining (20 patients) had no clinical carditis. On the other hand, 2D Echo Doppler confirmed the diagnosis of carditis in additional 10 cases without clinical carditis as shown in Table 2.

About almost all patients with acute rheumatic carditis (25/26) had mitral valve /aortic valve thickness >4mm. Valvular regurgitations were constituted the major manifestation; mitral regurgitation was found in the majority (21/26 patients) followed by aortic and tricuspid regurgitation. In addition, acute heart failure was present in 2/26 patients and the same number was seen with pericardial effusion as shown in Table 3.

Table 1. Base-line characteristics and frequency of major Jones criteria of patients with initial attack of acute rheumatic fever at the time of clinical evaluation.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22 (61.1%)</td>
</tr>
<tr>
<td>Female</td>
<td>14 (38.9%)</td>
</tr>
<tr>
<td>Age (year):</td>
<td></td>
</tr>
<tr>
<td>Age range</td>
<td>6-22</td>
</tr>
<tr>
<td>Age mean ±SD</td>
<td>13±4.69</td>
</tr>
</tbody>
</table>

Table 2. The role of Two-Dimensional Echocardiography and Doppler Color Flow in the diagnosis of carditis in patients with initial attack of acute rheumatic fever.

<table>
<thead>
<tr>
<th>Acute rheumatic fever</th>
<th>Carditis confirmed by Two-Dimensional Echocardiography and Doppler Color Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>With clinical carditis</td>
<td>16/16</td>
</tr>
<tr>
<td>Without clinical carditis</td>
<td>10/20</td>
</tr>
<tr>
<td>Total</td>
<td>26/36</td>
</tr>
</tbody>
</table>

Table 3. Features of acute rheumatic carditis (first attack) detected by Two-Dimensional Echocardiography and Doppler Color Flow in 26 cases.

<table>
<thead>
<tr>
<th>Features detected by Two-Dimensional Echocardiography and Doppler Color Flow</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitral valve /Aortic valve thickness &gt;4mm</td>
<td>25 (96.2%)</td>
</tr>
<tr>
<td>Mitral regurgitation grade I-II</td>
<td>21 (80.8%)</td>
</tr>
<tr>
<td>Mitral valve prolapse</td>
<td>13 (50.0%)</td>
</tr>
<tr>
<td>Rheumatic nodule (beaded appearance )</td>
<td>7 (26.9%)</td>
</tr>
<tr>
<td>Aortic regurgitation</td>
<td>5 (19.2%)</td>
</tr>
<tr>
<td>Tricuspid regurgitation</td>
<td>4 (15.4%)</td>
</tr>
<tr>
<td>Pancarditis</td>
<td>2 (7.7%)</td>
</tr>
<tr>
<td>Combined mitral and aortic regurgitation</td>
<td>2 (7.7%)</td>
</tr>
<tr>
<td>Pericardial effusion</td>
<td>2 (7.7%)</td>
</tr>
<tr>
<td>Signs of cardiac failure</td>
<td>2 (7.7%)</td>
</tr>
</tbody>
</table>

Discussion

The recent guidelines of Australian and New Zealand on ARF have been accepted an echocardiographic subclinical carditis as a major criterion. So, all patients with suspected or definite diagnosis of ARF should undergo an echocardiography to detect the evidence of carditis.

In the current study; the frequency of primary episode ARF occurrence during 5 years was 36 (plus 4 cases were excluded) which was much less than the
frequency of Turkey study in which 118 cases were diagnosed during the period of 3 years only (2). This frequency of occurrence would not reflect the exact rate in Misan because some patients may be already referred to other centers.

Additionally, the present study showed that migratory polyarthritis (80.6%) was the commonest manifestation of the first attack ARF while a clinical carditis (44.4%) was the second presenting features. These rates were higher than Turkey (2).

A clinical carditis was diagnosed in less than half of cases (16/36 cases), which was slightly less than Caldas et al study who reported about 50% of cases had a clinical carditis (15). This may be related to a personal variation in the clinical skills of auscultation.

On the other hand, this study revealed that rheumatic carditis was more frequently diagnosed by 2D Echo Doppler than clinical examination, especially in sub-clinical carditis. These results were consistent with different studies (16, 17). A study by Marijon et al in Cambodia and Mozambique revealed that echocardiography can detect up to ten times the number of carditis in ARF in comparison to a clinical examination alone (18).

These findings suggest that carditis was missed by a clinical examination. Also, it was reported that the clinical skill of auscultation by the training physicians may be not the optimum one, especially, in areas where ARF is declining (19).

In addition, the precise diagnosis of both clinical and subclinical carditis by using 2D Echo Doppler has been documented and it is more accurate than clinical auscultation, and if integrated in the Jones criteria, it can prevent both over- and under-diagnosis of valvular pathology in ARF patients (20).

Diffuse thickening > 4 mm and valvulitis of the mitral valve leaflets was a universal feature in acute rheumatic carditis (25/26 cases). Therefore, any carditis without valvulitis or valvular thickening is unlikely to be rheumatic in origin (21).

In rheumatic carditis cases; there was 2/26 cases of acute heart failure, both of them were associated with valvular regurgitation. Obviously, echocardiography is more sensitive for diagnoses of valvular regurgitation with increasing rate in detecting mitral, aortic, and tricuspid regurgitation.

In spite of all these findings, till now, there is a fear from increase the chance of over diagnosing carditis in large proportion of ARF patients (5). The over interpretation of valvular regurgitation (physiological or trivial) may lead to misdiagnosis of an iatrogenic valvular disease (22). This was attributed to a higher sensitivity of 2D Echo Doppler in detecting the abnormal blood flow and valvular regurgitations (9, 10). On the other hand, the use of 2D Echo Doppler can decrease the over diagnosis of the functional murmur as a valvular heart disease (9, 10).

So, an accurate interpretation, as well as, the technical expertise with 2D Echo Doppler with following the World Heart Federation echocardiographic criteria are essential to reach a correct diagnosis and to avoid the over diagnosis in RHD patients (6, 11).

The current study clearly revealed a significant incremental diagnostic utility of 2D Echo Doppler in the first attack of ARF especially in subclinical carditis and can eliminate the over diagnosis of rheumatic carditis depending solely on cardiac auscultatory findings, hence, better diagnosis, treatment, and prophylaxis (23, 24).

Conclusion

The imaging study of Two-Dimensional Echocardiography and Doppler Color Flow is more sensitive than a clinical assessment in the detection of carditis in patients with an initial attack of acute rheumatic fever. It is a useful method in identifying the subclinical mitral and aortic valvular disease when carditis cannot be detected clinically. Therefore, it is reasonable and valuable to support the addition of echocardiographic stigmata of rheumatic carditis to the current diagnostic criteria as an isolated major criterion by itself for the validation of rheumatic carditis with subclinical carditis.

Disclosure statement: The authors report no conflict of interest and this research is not funded.

References


A Comparative Study of Different Types of Warm-up Effect on Postural Stability and Isokinetic Strength

Mohammad Ahsan
Assistant Professor, Department Physical Therapy, College of Applied Medical Sciences, Imam Abdulrahman Bin Faisal University, Dammam, Kingdom of Saudi Arabia

Abstract

To investigate which warm-up method is more effective on the postural stability and isokinetic strength, we conducted this study. Forty-five participants were recruited, all participants divided into three groups. Active warm-up consisted 12-minute jog on self-regulated treadmill followed by five push-ups, pull-ups, five-meter single leg hop to and from with alternate leg, five half and full squats, Passive warm-up consisted moist heat heating device, Combined warm-up involved active warm-up and passive warm-up exercises. The dynamic stability was tested by stabilometer. Test was done with open and closed eyes, with two stability level i.e. hard & easy. The isokinetic dynamometer was used to measure muscle performance. The test was done with 3 repetitions of concentric/concentric at low speed of 60/60/sec, followed by high speed of 180/180/sec. Data were analyzed and findings revealed that combined warm-up is effective as active and passive warm-up for postural stability and isokinetic strength with significance differences.

Keywords: Isokinetic Strength, Postural Stability, Warm-Up.

Introduction

Warm-up is commonly known as preparatory practice that aimed to improve the subsequent performance. It’s often prescribed with general cardiovascular warm-up of 10-20 minutes and stretching followed by a specific warm-up for the specific sports. Prior to any activity, coaches believed that warm-up foster better performance as well as reduce the degree of musculoskeletal injuries. Warm-up improves sports performance in many way by increase body temperature reduce muscle stiffness, increase muscle contraction speed, maximize the muscular-potential, increase heart-rate, increases blood-flow, better utilization of oxygen, greater economy of movement due to decreased muscle resistance, increase concentration and neuro-muscular signals for desired performance outcome in a competition.

There are few researches revealed that there are significant differences in sprint performance or agility and jump performance. The advantages of warm-up before the competition and sports activities remain universally accepted. Some of the investigations used more suitable protocols, either for specific or general warm-up. These researchers found that there are no deteriorations in performance due to warm-up. This might be because of following realistic warm-up protocol, or alternatively because of dynamic warm-up removing or reducing unfavorable effect. Generally, there are two types of warm-up Active and passive.

The active warm-up helps to reduce muscle stiffness through breakdown stable bound between myosin and actin filaments. Active warm-up improve performance in speed, endurance in swimming and accuracy in basketball foul-shooting, peak torque on a cycle ergometer, 55m runtime. Voluntary resistance methods of stimulating post-activation potentiation (e.g. loaded squat exercises) can enhance countermovement jump’s height and short- sprint performance. There were some improvements in vertical-jump performance with general warm-up, static stretching, and proprioceptive neuromuscular facilitation (PNF) performed by female participants. Neiva et al. found that swimmers were significantly 1.5% faster with warm-up while comparing with no warm-up.

Passive warm-up enhances blood flow into major muscle group and prevents energy expenditure. Numerous researchers such as and so on studied
the performance of untrained, moderate trained and trained male athletes with several warm-ups protocol and results showed that there were significant improvements in sprint time, average speed, peak velocity, peak torque at exercise, in comparison to without warm-up. Holmstrom and Aalborg27 also suggest that a small number of warm-ups might be effective for increasing and maintaining range of motion and muscle endurance for untrained male workers. Increase in the muscle performance reduces sports injuries and improve athletic performance28. There is a significant improvement in motor skills from balance training resulting in enhancing the rate of force development29.

Although active, passive and combined warm-up protocols are often prescribed before any sports activity; considerable studies have been accomplished on these concerns to determine effects of different protocols on performance. Some research has significant effect whereas others have non-significant effect. Due to unanimity concerning the effect of warm-up upon sports performance might be lack of heterogeneity to different exercise protocols. To investigate which warm-up (active, passive and combined) method is more effective on the isokinetic strength and postural stability we conduct this study.

Method

Participants:

Forty-five participants were recruited for this study, all participants divided into three groups (15 participants in each group). All players were injury-free and volunteered to participate in this study. The age: 28.6±5.6 years, height: 165.8±5.4cm. of participants. All participants were informed prior regarding objective, protocol, and risk associated with experimental procedures, they provide their consent for this study.

Warm-up methods:

Active Warm-up: Active warm-up (AWU) included different exercises as intervention. AWU started with 12-minute jog on self-regulated treadmill followed by five push-ups, pull-ups, five-meter single leg hop to and from with alternate leg, five half and full squats.

Passive Warm-up: Passive warm-up (PWU) consist moist heat heating device that included eight Chattanooga original hydro-collator moist heat hot packs (Standard-size 10” x 12”) as an intervention. PWU started to leg and hip muscles (Gluteus, Hamstrings, Quadriceps, Gastrocnemius, and soleus) for 20-minutes duration. During application, participants lay down in prone position.

Combined Warm-up (CWU): it involved both warm-up exercises. The only difference is that 6-minute jog followed by five push-ups, pull-ups, five-meter single leg hop to and from with alternate leg and hydro-collator moist heat hot packs were applied over the leg and hip muscles for 12 minutes duration.

Postural Stability Test:

The postural stability was measured by stabilometer (Techno-Body Machine). For the unipedal test, each participant stands with dominant leg on the platform with his hands on his waist. Each test took 30 seconds. Each test was done with open and closed eyes, with two stability level hard and easy. Instructions were followed according to user manual for standardized testing procedure.

Muscles Strength Measurement:

Isokinetic dynamometer (BIODEX) was used to measure muscle performance. The range of motion was set as 0 degree and 100 degrees away from the body and toward body respectively. Weight of leg was measured by fixing on 90 degrees of flexion. Participant performed five repetitions of CON/CON at low speed of 60/60/sec, followed by a high speed of 180/180/sec. One minute rest was given between velocities.

Statistical analysis:

The collected data were statistically analyzed by using SPSS v-20. Descriptive statistic and one-way analysis of variance (ANOVA) with LSD post-hoc were computed to explore significant difference of active, passive and combined warm-up on the postural stability and isokinetic strength. Level of significance was set at 0.05.
**Results**

Table-1: Statistics of different types of warm-up to test postural stability at soft and hard level

<table>
<thead>
<tr>
<th>POSTURAL STABILITY</th>
<th>Open-Eyes (easy-level)</th>
<th>Close-Eyes (easy-level)</th>
<th>Open-Eyes (hard-level)</th>
<th>Close-Eyes (hard-level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm-up</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>Combined</td>
<td>1.29±0.37</td>
<td>2.43±0.44</td>
<td>1.66±0.63</td>
<td>5.26±0.77</td>
</tr>
<tr>
<td>Active</td>
<td>0.82±0.12</td>
<td>1.61±0.32</td>
<td>1.51±0.35</td>
<td>3.71±0.91</td>
</tr>
<tr>
<td>Passive</td>
<td>0.71±0.12</td>
<td>1.81±0.32</td>
<td>2.02±0.55</td>
<td>4.08±0.47</td>
</tr>
</tbody>
</table>

One-way ANOVA

<table>
<thead>
<tr>
<th>Between-Groups</th>
<th>F</th>
<th>10.449</th>
<th>8.107</th>
<th>1.636</th>
<th>6.487</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sig.</td>
<td></td>
<td>0.001</td>
<td>0.004</td>
<td>0.228</td>
<td>0.009</td>
</tr>
</tbody>
</table>

POST-HOC

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>Mean Differences (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combine v/s Active</td>
<td>.472*(0.002)</td>
</tr>
<tr>
<td>Combine v/s Passive</td>
<td>.578*(0.001)</td>
</tr>
<tr>
<td>Active v/s Passive</td>
<td>.106(0.403)</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

The above table revealed that calculated value of F=10.449, 8.107, and 6.487 for postural stability at open-eyes and closed-eyes with easy-level, and hard level respectively showed significant differences in between different types of warm-up. Whereas the calculated value of F=1.636 for open eyes at hard level showed insignificant difference. Thus, LSD has been calculated to determine existence of significant mean difference between warm-ups. LSD showed that combine v/s active and combine v/s passive have a significant difference with open and close-eyes at easy level, whereas combine v/s active also have significant difference with closed-eyes at hard-level. Further, Active v/s passive warm-up showed no significant difference at any level for postural stability.
Table-2: Statistics of different types warm-up for isokinetic strength (quadriceps and hamstring) performance

<table>
<thead>
<tr>
<th>ISOKINETIC STRENGTH (Peak-Torque)</th>
<th>Quadriceps 60°/sec</th>
<th>Hamstring 60°/sec</th>
<th>Quadriceps 180°/sec</th>
<th>Hamstring 180°/sec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm-up</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>Combined</td>
<td>178.40±8.08</td>
<td>109.80±8.35</td>
<td>115.80±6.30</td>
<td>86.40±6.58</td>
</tr>
<tr>
<td>Active</td>
<td>169.57±17.34</td>
<td>122.29±10.24</td>
<td>120.29±10.55</td>
<td>86.71±9.16</td>
</tr>
<tr>
<td>Passive</td>
<td>145.50±17.17</td>
<td>105.67±13.22</td>
<td>97.17±12.45</td>
<td>87.67±9.33</td>
</tr>
</tbody>
</table>

One-way ANOVA

<table>
<thead>
<tr>
<th>Between-Groups</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7.011</td>
<td>0.007</td>
</tr>
<tr>
<td></td>
<td>4.109</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>8.736</td>
<td>0.003</td>
</tr>
<tr>
<td></td>
<td>0.034</td>
<td>0.967</td>
</tr>
</tbody>
</table>

POST-HOC

<table>
<thead>
<tr>
<th>Warm-up</th>
<th>LSD</th>
<th>Mean Differences (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combine v/s</td>
<td>8.829(.342)</td>
<td>12.486(0.69)</td>
</tr>
<tr>
<td>Active</td>
<td>-4.486(.470)</td>
<td>-3.14(.951)</td>
</tr>
<tr>
<td>Combine v/s</td>
<td>32.900*(.003)</td>
<td>4.133(.541)</td>
</tr>
<tr>
<td>Passive</td>
<td>18.633*(009)</td>
<td>-1.267(8.11)</td>
</tr>
<tr>
<td>Active v/s</td>
<td>24.071*(.013)</td>
<td>16.619*(0.15)</td>
</tr>
<tr>
<td>Passive</td>
<td>23.119*(.001)</td>
<td>-9.52(8.45)</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level

The above table revealed that the calculated value of F=7.011, 4.109, and 8.736 for isokinetic strength quadriceps-60°/sec, hamstring-60°/sec and quadriceps-180°/sec respectively, showed significant differences for different types of warm-up. Whereas, calculated value of F=0.034 for hamstring 180°/sec showed insignificant difference. Thus, LSD has been calculated to determine the existence of significant mean difference between warm-ups. LSD showed that combine v/s passive and active v/s passive warm-up have significant differences with Quadriceps-60°/sec, Hamstring-60°/sec, Quadriceps-180°/sec, whereas, hamstring with 180°/sec speeds does not show any significant difference. Further, combine v/s active warm-up showed no significant difference at any level of isokinetic strength.

![Figure-1: Distribution of combined, active and passive warm-up on postural stability for open and closed eyes at hard & easy level](image-url)
In figure-1, postural stability for combined, active and passive warm-up are represented. It is shown that combined warm-up is more effective than active and passive warm-up.

In figure-2, mean distribution for isokinetic strength for combined, active and passive warm-up are represented. It is shown that combined warm-up is effective as active and passive warm-up.

**Discussion**

The findings revealed that there are significant effects of warm-up method on isokinetic strength and postural stability. It has been realized that the results of this study were similar to the results that Gogte et al.\(^{30}\) found in their study for the recreational athletes. To improve sports performance any types of warm-up methods could be used. Daneshjoo et al.\(^{31}\) reported that active and passive warm-up for dynamic balance revealed improvement as well as indicating significant difference with control group. Static balance for opened and closed eyes and dynamic balance were increased in both groups. The active and passive warm-up program have been presented as improve in proprioception and balance. Nejati\(^{32}\) noticed that there were significant effects on balance and agility performance with static and dynamic stretching warm-up as compare to no stretching warm-up. Morales-Artacho et al.\(^{33}\) suggested that cycling performance does not have acute superior effect on muscle stiffness with combined warm-up, while muscle stiffness is reduced with an active warm-up. The whole-body warm-up on the treadmill increase aerobic capacity, enhance muscle performance during competition or any activity, it also has a positive effect on balance ability\(^{34}\). Wood et al.\(^{35}\) reported that muscle temperature increased as a result of general and specific warm-up activity; also affect the muscle performance by diminishing the muscle’s viscous resistance.

The findings of this research were not confirmed by the studies of Kar and Banerjee\(^{36}\) that passive and active warm-up has an effect on motor performance with trained athletes regarding no warm-up, but the findings are not significant with untrained athletes. Andrade et al.\(^{37}\) conclude from their study that there is improvement in slow stretch-shortening cycle muscle performance by the general, specific and combined warm-up, except specific warm-up that improves fast stretch-shortening muscle performance. Romero-Franco\(^{38}\) clarifies in his study that duration of different warm-up protocol effects on postural stability, which may be useful for injuries prevention during training. Ozengin\(^{39}\), also observed no significant effect on vertical jump performance after different warm-up protocols (general warm-up and warming-up with static stretching) in gymnasts. Faigenbaum AD\(^{40}\) does not find any significant difference in flexibility by the following three types of warming up protocol.
Conclusion

The present findings are consistent with 30,31,32,33,34 & 35 but not all 36,37,38,39, & 40 earlier research that has explored impact of warm-up on isokinetic strength and postural stability. The better-controlled researches are required to interpret the mechanisms responsible for changes in performance following any types of warm-up protocol for the specific sports performance components, rather than replicating commonly used warm-up protocols.

Source of Funding- Self

Conflict of Interest – Nil

Ethical Clearance- Taken from institutional review board committee, IAU.

References


Evaluation of the Effects of Insulin Therapy on peripheral Nervous System in Diabetic Patients

Mufeed Akram Taha

MBChB, FIBMS Neurology, Department of Medicine, College of Medicine, University of Kirkuk - Iraq

Abstract

Peripheral neuropathy is common diabetic complication that associated with high rates of morbidity and mortality. Insulin therapy is essential in treatment of diabetic peripheral neuropathy; however, rapid strict glycemic control may lead to many complications such as neuropathy. This study performed to evaluate the effect of insulin therapy on peripheral nervous system in patients with type 2 diabetes. This study was conducted in outpatient clinics of Neurology departments of “Azadi Teaching Hospital in Kirkuk city-Iraq” during the period from the 1st of October, 2015 to 30th of September, 2017 included 50 type 2 diabetic patients treated with insulin therapy. Patients followed up at 3rd and 6th months after first examination by evaluating fasting blood sugar, hemoglobin A1c, Toronto scoring and nerve conduction study. Findings revealed predominance of females. There was a significant decline in overnight fasting blood sugar and hemoglobin A1c levels after 6 months follow up (p<0.001). The mean Toronto score increased from 5.9 at baseline to 10.6 after 3 months and 12.1 after 6 months. In conclusion the rapid strict glycemic control of blood sugar level is obviously considered to be a risk factor for peripheral neuropathy development among type 2 diabetic patients.

Keywords: Type 2 diabetes mellitus, Insulin treatment, Peripheral neuropathy.

Introduction

The diabetes mellitus (DM) is a common public health problem globally with an estimated 422 million diabetics all over the world at 2014 and a global prevalence of 8.5% in adult population 1. In Iraq, DM prevalence increased from 5% at 1978 to 19.7% at 2012 representing the main challenge for national health system 2. Obesity and overweight of Iraqi population is regarded as the main risk factor for developing DM, specifically type 2 3. Diabetic neuropathy is the DM complication that caused by damage to peripheral nervous system affecting about 50% of diabetic patients and accompanied by high morbidity 4. The prevalence of diabetic neuropathy is estimated to reach about 76.2% among Iraq diabetic patients 5. Poor glycemic control, high blood pressure and dyslipidemia are considered as common risk factors for diabetic neuropathy in Middle East 6. There are different types of peripheral nervous system damages attributed to DM mostly affecting nerves of the feet, called stocking-glove neuropathy 7. The peripheral nerve cell injury is starting at onset of hyperglycemia before diagnosis of DM 8. An appropriate knowledge in pathogenesis diabetic neuropathy is important to design an effective pharmacological and non-pharmacological management for neuropathy 9. Nowadays, the efforts are concentrated on cellular destruction accompanied by different processes caused by hyperglycemia such as reactive oxygen species, polyol flux and advanced glycation end-products 10. Insulin deficiency, resistance and consequent hyperglycemia are the standard pathogenic features of both types of DM 11. The insulin is the cornerstone in management of both DM types that resistant to oral hypoglycemic therapy 1. The insulin signaling has an essential role in physiology of both central and peripheral nervous systems in addition to prevention of hyperglycemic hazardous effects on both nervous systems 12. The insulin is a potent neurotrophic factor play a major role in proper neuronal function 13. However, hyperinsulinemia and

Corresponding author:
Mufeed Akram Taha
email: mofeedakram@yahoo.com

DOI Number: 10.5958/0976-5506.2019.00744.7
hypoglycemia caused by insulin are devastating for each of central and peripheral nervous systems. In spite of glucose transport into the endoneurium, the peripheral nervous system neurons and Schwann cells are not sensitive to insulin, the insulin receptors are involved in peripheral nervous system. The first reports on neuropathy were recorded earlier in 20th century and known as “insulin neuritis” which was caused by rapid reversal of hyperglycaemia and clinically presented by distal sensory polyneuropathy occurring after one month of developing within a month of rapid and strict glycemic control by insulin treatment. Additionally, many authors reported the same presentation of peripheral neuropathies after insulinomas. Unfortunately, peripheral neuropathy following aggressive insulin treatment for diabetic patients were also detected in diabetic patients on oral antiglycemic agents but with less frequency. This paradox of neuropathy resulted from rapid treatment of diabetic patients with insulin is mostly under-recognized complication, however it is easily prevented by physicians through better monitoring of glycemic control with glycosylated hemoglobin.

High prevalence of type 2 diabetes resistant to oral antidiabetic therapy and obesity as well as lack of well-organized DM centers play role in increasing incidence of peripheral neuropathy complications in Kirkuk city. The aim of the present study was to evaluate the effect of insulin therapy on peripheral nervous system of type 2 diabetic patients.

Patients And Method

This was a prospective study conducted at the outpatient clinics of Neurology department of “Azadi Teaching Hospital in Kirkuk city-Iraq” during the period from 1st of October, 2015 to 30th of September, 2017. Included 50 cases with type two diabetic patients who attended to internal medicine outpatient clinic and referred to Neurology outpatient clinic for neurological examination were the study population. Inclusion criteria were age group 28-70 years, type 2 DM with duration of more than one year, those who had neuropathy should not be attributed to other causes rather than DM and newly indicated for insulin therapy. Patients on previous insulin therapy, peripheral neuropathy related to other diseases, peripheral neuropathy related to drugs and patient lost to follow up were excluded. An “informed oral consent was taken from each patient before enrolling in the study and an ethical agreement was taken from administration of the hospital in addition to urgent treatment was given for selected patient by the researcher. The type 2 DM was defined according to American Diabetic Association Classification (fasting plasma glucose ≥126 mg/dL and 2 hours postprandial plasma glucose ≥200 mg/dL). All patients were on oral hypoglycemic drugs and changed by Internal Medicine physician to insulin treatment. Diagnosis of diabetic neuropathy was carried out according to Neurological and electrophysiological examination. All the investigations were conducted in the Laboratory of Azadi Teaching Hospital. Fasting blood glucose and HbA1C were measured. Electrophysiological study performed with (Neuropack MEB-9400 S1 Series EMG/NCV/EP Measuring System), and then scored by Toronto Clinical Neuropathy Scoring System (No neuropathy 0 - 5), (mild neuropathy 6 - 8), (moderate 9 - 11) and (severe diabetic neuropathy 12 or more). The Nerve Conduction Study (NCS) was conducted for median motor and sensory, ulnar motor and sensory, Radial motor and superficial radial sensory, Peroneal,Tibial, superficial peroneal sensory and sural nerves. The peripheral neuropathy of selected patients was classified by researcher depending on classification adopted by previous literature. After starting insulin therapy, follow up and re-evaluation of patients was done at the 3rd and 6th months after first examination at each visit, fasting blood sugar, HbA1C, Toronto scoring and nerve conduction study were performed. Statistical analysis was achieved by SPSS software version 22. On analysis, the Chi-square test, independent sample t-test and general linear models (repeated measures) were used for statistical analysis as appropriate. “P value less than 0.05 was considered statistically significant.

Findings

This study included 50 diabetic patients with mean age 54.1±10.8 years; 13 (26%) patients in age group less than 50 years, 12 (24%) patients in age group 50-59 years and 25 (50%) patients in age of 60 years and more. Male gender represented by 48% of diabetic patients and female gender were represented by 52% of them. Mean age at diagnosis of DM was 43.4±4.6 years; 20% of them had DM at age of less than 40 years, 66% of them had DM at age group of 40-49 years and 14% of them had DM at age of 50 years and more. Mean DM duration of patients was 10.7±7.9 years; 21 (42%) patients were with DM duration of less than 10 years, while 29 (58%) patients were with DM duration of ten years and more. (Table 1)
Table 1: General characteristics of diabetic patients (no=50).

<table>
<thead>
<tr>
<th>Variable</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>&lt;50 years</td>
<td>13 (26.0)</td>
</tr>
<tr>
<td>50-59 years</td>
<td>12 (24.0)</td>
</tr>
<tr>
<td>≥60 years</td>
<td>25 (50.0)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24 (48.0)</td>
</tr>
<tr>
<td>Female</td>
<td>26 (52.0)</td>
</tr>
<tr>
<td>Age at DM onset</td>
<td></td>
</tr>
<tr>
<td>&lt;40 years</td>
<td>10 (20.0)</td>
</tr>
<tr>
<td>40-49 years</td>
<td>33 (66.0)</td>
</tr>
<tr>
<td>≥50 years</td>
<td>7 (14.0)</td>
</tr>
<tr>
<td>DM duration</td>
<td></td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>21 (42.0)</td>
</tr>
<tr>
<td>≥10 years</td>
<td>29 (58.0)</td>
</tr>
</tbody>
</table>

Mean age (SD) : 54.1 (10.8) years
Mean age at onset of DM : 43.4 (4.6) years
Mean duration of DM (SD): 10.7 (7.9)

The means of FBS and HbA1c of diabetic patients at examination were 162.6 mg/dl and 11.17%, respectively, which were decreased after 3 months to 112.1 mg/dl for FBS and 7.8% for HbA1c, while after 6 months the FBS reduced to 105.1 mg/dl and HbA1c reduced to 7.3%. There was a significant decline in FBS and HbA1c levels after 6 months (p<0.001). For neural profile, a significant increase in Toronto score was observed after 6 months (p<0.001), the Toronto score mean at examination of diabetic patients was 5.9, after 3 months it increased to 10.6 and after 6 months it raised to 12.1. Regarding NCS, there was a highly significant association between acute sensory neuropathy and examination of diabetic patients after 3 and 6 months (p<0.001). (Table 2)

Table 2. Distribution of glycemic and neural profiles of diabetic patients at subsequent 3 examinations (no=50).

<table>
<thead>
<tr>
<th>Variable</th>
<th>At examination</th>
<th>After 3 months</th>
<th>After 6 months</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS (mg/dl) mean (SD)</td>
<td>162.6 (11.8)</td>
<td>112.1 (25.4)</td>
<td>105.1 (23)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>HbA1c % mean (SD)</td>
<td>11.17 (1.14)</td>
<td>7.8 (1.7)</td>
<td>7.3 (1.5)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Toronto score mean (SD)</td>
<td>5.9 (3)</td>
<td>10.6 (3.9)</td>
<td>12.1 (5.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal no (%)</td>
<td>26 (52.0)</td>
<td>10 (20.0)</td>
<td>10 (20.0)</td>
<td></td>
</tr>
<tr>
<td>Acute sensory no (%)</td>
<td>-</td>
<td>16 (32.0)</td>
<td>16 (32.0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Chronic sensorimotor no (%)</td>
<td>24 (48.0)</td>
<td>24 (48.0)</td>
<td>24 (48.0)</td>
<td></td>
</tr>
</tbody>
</table>
The Toronto score after 6 months for diabetic patients with duration of less than 10 years was 9 while for diabetic patients of DM duration of 10 years and more was 14.2 with a highly significant difference between both groups (p<0.001). There was a highly significant association between acute sensory neuropathy and diabetic patients with shorter DM duration (p<0.001). (Table 3)

Table 3. Distribution of neural profile of diabetic patients after 6 months according to diabetes mellitus duration (n=50).

<table>
<thead>
<tr>
<th>Variable</th>
<th>&lt;10 years (n=21)</th>
<th>≥10 years (n=29)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toronto score mean (SD)</td>
<td>9 (5.9)</td>
<td>14.2 (3.1)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NCS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal n(%)</td>
<td>10 (47.6)</td>
<td>0 (0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Acute sensory n (%)</td>
<td>11 (52.4)</td>
<td>5 (17.2)</td>
<td></td>
</tr>
<tr>
<td>Chronic sensorimotor n(%)</td>
<td>0 (0)</td>
<td>24 (82.8)</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Peripheral neuropathy related to DM is the leading cause for high rates of morbidity and mortality. Despite exact pathogenesis of peripheral neuropathy is unknown till now, increased blood sugar level is not only the cause for diabetic neuropathy. In current study the glycemic control of diabetic patients was significantly achieved by significant reduction of fasting blood sugar and HbA1c level after six months of insulin treatment (p<0.001). Present study showed that after six months of insulin treatment, there was a significantly increased in Toronto score and acute sensory neuropathy of diabetic patients (p<0.001). This finding is similar to results of Gibbons and Freeman study in USA which stated that rapid decline in blood sugar level of diabetic patients lead to increased incidence of peripheral neuropathy. In UK, a study carried out by Knopp et al documented that after rapid glycemic control of both type1 and type 2 DM, insulin neuritis or treatment induced neuropathy are common, reversible and associated with pain. Peripheral neuropathy subsequent to rapid strict control of hyperglycaemia uncontrolled diabetic patients is often appears as emergent iatrogenic complication. Although little number of researches discussing insulin treatment induced neuropathy, this type of neuropathy might refer to high neuropathy prevalence among diabetics. Sometimes, the big burden of this complication is neglected by many authors.

Our study showed that after 6 months of insulin treatment, the Toronto score was increased significantly among diabetic patients with long DM duration, while nerve conduction study showed that the acute sensory neuropathy were increased among diabetic patients with shorter DM duration, indicating that acute sensory neuropathy were not related to DM duration as the chronic lesions, but related in current study with rapid effect of insulin treatment. A randomized controlled meta-analysis studies that done by Boussageon et al in France found no helpful outcome of rapid and strict glucose control in preventing peripheral neuropathy among type two diabetes mellitus patients. Callaghan et al conducted a Cochrane review and found that enhanced glucose control in type two diabetic patients may increase incidence of neuropathy. Previous American study reported that intensive insulin treatment of diabetic patients induced peripheral neuropathy clinically presented as acute, severe pain and autonomic dysfunction. In some cases the peripheral neuropathy are accompanied with diabetic retinopathy indicating sharing the same pathophysiological mechanism. The main limitations of present study were observation not interventional study and single center study.

In conclusion, the rapid strict glycemic control of blood sugar level is obviously a risk factor for development of peripheral neuropathy among type 2 diabetic patients. Further longitudinal multi-centers studies on effect of insulin therapy on peripheral nervous system must be supported.
Ethical approval: Official agreements were obtained from the local ethical committee of Kirkuk health directorate. Informed signed consent was obtained from each participant, data of the patients were collected in accordance with World Medical Association declaration of Helsinki, 2013 as a statement of ethical principles for medical research involving human

Conflict of interest: Author declare none

Funding: self-funded

References


Differences in Self-Efficacy Before and After Antenatal Education

Nur Jaqin¹, Muh. Syafar², Arsunan A.A³, Prihantono⁴, Suryani A⁵
¹ Doctoral Study Program, ² Department of Health Promotion, Faculty of Public Health, ³ Department of Epidemiology, Faculty of Public Health, ⁴ Departement of Surgery, ⁵ Department of Clinical Nutritional, Faculty of Medicine; Hasanuddin University, Makassar, Indonesia

Abstract

Introduction: Antenatal education is an action to improve the health condition of pregnant women so that they can give birth to healthy generations for the future. Antenatal education greatly influences the knowledge and attitudes of pregnant women and families to maintain normal pregnancy and childbirth, and not be late in getting help if needed. Increased self-efficacy has received considerable attention because it can have an impact on maternal and child health, even the willingness of mothers to breastfeed their babies is associated with their efficacy. Objective: This study aimed to assess differences in self-efficacy before and after antenatal education about danger signs of pregnancy, dangers signs of labor a BPCR. Methodology: This study was an intervention study using a quasi-experimental design with a pre-test and post-test design with a control group. Results: Differences in self-efficacy before and after antenatal education during pregnancy, there were three respondents with lower self-efficacy results after antenatal education than before education. While there were 24 people who experienced an increase in self-efficacy better than before training during pregnancy, and nine people had constant self-efficacy (no change) after education during pregnancy. The results of the study showed that there were differences in self-efficacy before and after antenatal education about danger signs of pregnancy, dangers signs of labor a BPCR with a value of \( t <0.05 \). Conclusion: There was an increase in self-efficacy before and after antenatal education.

Keywords: Self-Efficacy, Dangers Signs of Pregnancy and labor, Birth Preparedness and Complication Readiness

Introduction

Self-efficacy focuses on oneself by showing specific behavioral abilities. According to social cognitive theory, the low condition of self-efficacy will affect the increase in anxiety and tend to avoid activities that can worsen the situation, because they feel unable to manage aspects that can cause risk. A person’s ability can be improved through education so that it will increase self-confidence¹ and self-efficacy is not a specific behavior.¹

Antenatal education is carried out by health providers in a planned manner to prepare a group of pregnant women and with their husbands in delivering information to a pregnant woman and other pregnant women.²

The results of the study on the acceptance of self-efficacy against antenatal education showed \( p \)-value (0.201) before training and \( p \)-value (0.001) within four months after education.³ Research on the effects of antenatal education on increasing self-efficacy showed \( p \)-value (0.001) in the intervention group and \( p \)-value (0.057) in the control group.⁴ The impact of growing self-efficacy on behavior change showed \( p \)-value (0.000) in the intervention group and \( p \)-value (0.596) in the control group.⁵

Occurrence 3Ds are late in recognizing danger signs and making decisions, reaching health facilities too late, being handled late by health workers, especially in an emergency, so that the mother and fetus die.⁶ In Gowa Regency, maternal deaths related to 3Ds were deaths at home (0.14%), en route (0.21%), Public Health Center/Mother and Child Hospital (0.14%) and the highest mortality (0.79 %) occurred in hospitals.⁷
BPCR is essential antenatal services initiated by health providers when antenatal care or home visits by community health workers. It is the first WHO recommendations. BPCR is intended so that every woman who is pregnant at the time of delivery has a birth plan and complication readiness from the beginning of pregnancy.

The results showed that decision making (68.1%) chose skilled health personnel and gave birth in health facilities, (33%) wanted to be at home not by health workers. Other research results showed (84.6%) prepared funds, 12.9% were ready to donate blood, and 90% understood the danger signs of pregnancy and childbirth, and gave birth in health facilities.\(^9\)

**Material and Method**

This is a quasi-experimental study with a pre and post-test design. The research was conducted in the working area of Public Health Center of Kampili, Villages of Julu Pa’Mai and Toddotoa, Gowa Regency. The sample size of each group was 17 people, thus a total sample of 34 pregnant women (for two groups). The selection of respondents in both groups was pregnant women with gestational age 26-38 weeks (second and third trimesters). Nominal data were reported in the form of \(n,\%\) and then processed using the Wilcoxon test to assess the difference (comparative hypothesis)

**Results**

**Table 1: Characteristics of Respondents**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1</th>
<th></th>
<th></th>
<th>Group 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\Sigma)</td>
<td>%</td>
<td>(\Sigma)</td>
<td>%</td>
<td>(\Sigma)</td>
<td>%</td>
</tr>
<tr>
<td>Age of Respondents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>2</td>
<td>5.56</td>
<td>--</td>
<td>--</td>
<td>2</td>
<td>5.56</td>
</tr>
<tr>
<td>20-35</td>
<td>14</td>
<td>38.88</td>
<td>17</td>
<td>47.22</td>
<td>31</td>
<td>86.11</td>
</tr>
<tr>
<td>&gt;35</td>
<td>1</td>
<td>2.78</td>
<td>2</td>
<td>5.56</td>
<td>3</td>
<td>8.33</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>22.22</td>
<td>5</td>
<td>13.88</td>
<td>13</td>
<td>36.11</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>13.88</td>
<td>9</td>
<td>25.00</td>
<td>14</td>
<td>38.88</td>
</tr>
<tr>
<td>≥3</td>
<td>4</td>
<td>11.11</td>
<td>5</td>
<td>13.88</td>
<td>9</td>
<td>25.00</td>
</tr>
<tr>
<td>Gestational Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6 months</td>
<td>10</td>
<td>27.77</td>
<td>4</td>
<td>11.11</td>
<td>14</td>
<td>38.89</td>
</tr>
<tr>
<td>7-9 months</td>
<td>7</td>
<td>19.44</td>
<td>15</td>
<td>41.67</td>
<td>22</td>
<td>61.11</td>
</tr>
<tr>
<td>Education Level of Respondents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic</td>
<td>2</td>
<td>5.55</td>
<td>3</td>
<td>8.33</td>
<td>5</td>
<td>13.88</td>
</tr>
<tr>
<td>Middle</td>
<td>15</td>
<td>41.66</td>
<td>16</td>
<td>44.45</td>
<td>31</td>
<td>86.11</td>
</tr>
<tr>
<td>Age of Husband</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>13</td>
<td>36.11</td>
<td>8</td>
<td>22.22</td>
<td>21</td>
<td>58.33</td>
</tr>
<tr>
<td>30 – 39</td>
<td>3</td>
<td>8.33</td>
<td>9</td>
<td>25.00</td>
<td>12</td>
<td>33.33</td>
</tr>
<tr>
<td>40 – 49</td>
<td>--</td>
<td>--</td>
<td>2</td>
<td>5.55</td>
<td>2</td>
<td>5.55</td>
</tr>
<tr>
<td>≥ 50</td>
<td>1</td>
<td>2.77</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>2.77</td>
</tr>
</tbody>
</table>

Table 1 showed that the majority of respondents in this study were 20-35 years old, that was as many as 31 people (86.11%), and the least was those <20 years old, that is as many as two people (5.56%). The data showed that the respondents who were the study samples were distributed in parity one as many as 13 people (36.11%) and parity two as many as 14 people (38.88%), and parity≥three as many as nine people (25%).
Respondents of pregnant women with junior and senior high school education were 15 people (41.7%) and 14 people (38.9%) respectively. With this level of education, respondents were considered eligible to give answers according to the purpose of the interview through a questionnaire.

**Table 2: Research Variables based on Pretest and Post Test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Self-Efficacy:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strong</td>
<td>23</td>
<td>63.8</td>
</tr>
<tr>
<td>Weak</td>
<td>13</td>
<td>36.1</td>
</tr>
<tr>
<td>Knowledge of Pregnancy Danger Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>16</td>
<td>44.4</td>
</tr>
<tr>
<td>Less</td>
<td>20</td>
<td>55.6</td>
</tr>
<tr>
<td>Knowledge of Labour Danger Sign</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td>Less</td>
<td>33</td>
<td>91.7</td>
</tr>
<tr>
<td>Knowledge of BPCR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>26</td>
<td>72.2</td>
</tr>
<tr>
<td>Less</td>
<td>10</td>
<td>27.8</td>
</tr>
<tr>
<td>Practices of BPCR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>21</td>
<td>58.3</td>
</tr>
<tr>
<td>Less</td>
<td>15</td>
<td>41.7</td>
</tr>
</tbody>
</table>

In table 2 there were self-efficacy data which showed the results of pretest 23 people (63.88%) with strong self-efficacy increased to 35 people (97.2%). These results also showed weak self-efficacy, there were 13 people (36.1%) at the pre-test, but after post-test, there was still one person (2.8%) with weak self-efficacy.

The results of pretest pregnancy danger signs that have enough knowledge 16 respondents (44.4%) and posttest results increased to 33 respondents (91.7%). Respondents with the results of pretest knowledge of pregnancy danger signs which were still less than 20 people (55.6%) compared to the results after the post-test still have three people (8.3%) with insufficient knowledge.

The results of pretest labor danger signs who had sufficient knowledge were only three people (8.3%), and the post-test results had increased to 26 people (72.2%). Respondents with the results of pretest knowledge of childbirth danger which still lacked 33 (91.7%) people compared to the results after the post-test there were still 10 (27.8%) people with insufficient knowledge.

The results of pre-test knowledge about BPCR with sufficient experience of 26 people (72.2%) and posttest results increased to 32 people (88.9%). Respondents with the result of BPCR knowledge pretest that was less than ten people (27.8%) compared to after the post-test there were still four people (11.1%) who still lacked knowledge.

The pretest results showed the practices of BPCR with sufficient scores of 21 people (58.3%) and the posttest results had increased to 31 people (86.1%). The results of the pretest practice of BPCR which were still lacking were 15 respondents (41.7%), compared to the results of the post-test there were still five respondents (13.9%) who still lack knowledge.
Table 3: Differences in Self-Efficacy Before and After Antenatal Education about Dangers Signs of Pregnancy, Dangers Signs of Labor and BPCR

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Pretest – Posttest</th>
<th>n</th>
<th>Significance (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Efficacy</td>
<td>Negative Ranks</td>
<td>3</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Positif ranks</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ties</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

Results: Wilcoxon Test

This Table showed the differences in self-efficacy before and after antenatal education during pregnancy. There were three respondents with lower self-efficacy results after antenatal education than before education. While there were 24 people who experienced an increase in self-efficacy better than before education during pregnancy, and nine people had constant self-efficacy (no change) after education during pregnancy.

The Wilcoxon test results obtained a significance value of 0.000 (p <0.05). Thus it was concluded that there were significant differences in self-efficacy before and after antenatal education.

Discussion

Efficacy plays an essential role in everyday life. A person will be able to use his/ her potential optimally when high self-efficacy support is formed. Antenatal education is a crucial activity in essential services by midwives, where through antenatal education, pregnant women are helped to have better self-efficacy so that they are better prepared to face labor. Some of the benefits that can be obtained include being able to shorten the time of delivery, and early detection of labor will be better.11 Also, self-efficacy can reduce medical action, reduce the risk of anesthesia, reduce the level of anxiety, increase the sense of comfort that is evident in developing countries self-efficacy can reduce abnormal section and labor.12,13

Social support and acceptance of self-efficacy towards behavior play an essential role in pregnant women how pregnant women can adapt to pregnancy. This study provides an overview of the impact of educational interventions through social support and acceptance of self-efficacy during pregnancy. The results of other studies14 showed the effects of the educational intervention, the average score before treatment 12.62 ± 2.63 which increased to 17.71 ± 1.56 after three months of giving educational intervention, which was statistically significant p = 0.000, meaning educational interventions improve self-efficacy during pregnancy and childbirth. The development of educational programs through social support and acceptance of self-efficacy during pregnancy are expected to be carried out because it is beneficial and efficient.

This showed that antenatal education provides real changes to help pregnant women improve their self-efficacy and reduce pain, especially in the first and second stage of labor.14

Some of the inhibiting factors in seeking hospital help include the condition of being pregnant out of wedlock, transportation problems, and challenges for people who cannot afford to be free of costs. This study improves the perception of using skilled workers in labor delivery where all births require prior preparation and must be able to recognize the danger signs of labor that could threaten the safety of both the mother and the fetus.15

Relating to the danger signs of pregnancy and childbirth stated that out of 384 respondents, 17.4% had experience experiencing danger signs of pregnancy and reported visiting health workers after recognizing danger signs. Among those who knew the danger sign as many as 91% attended health services. Other contributing factors were those1,3 % without education, 45.6% elementary school education, 44.8%, middle and8.3%high school education, more than half the participants (58%) were able to explain one of the three danger signs, 31.5% have correct knowledge and at least recognize four danger signs of pregnancy, and there are 2.7% who do not know at all.16
The findings in another study conducted by Tilden, suggesting an increase in self-efficacy in labor that is associated with several variations, in general, can increase pregnancy outcomes. It is evident that self-efficacy in labor is a social factor that can be modified by increasing interventions on self-efficacy. The results of the two groups’ studies found a significant change in different self-efficacy for the two groups. The group showed evidence of increased changes in self-efficacy for labor and birth after being given self-efficacy interventions.

In addition to during pregnancy and childbirth, self-efficacy also has an impact on the postpartum period, where low self-efficacy at the end of pregnancy can cause postpartum depression. This is in line with the study, who sought the relationship of social support and postnatal depression to self-efficacy showed that there was a significant relationship between the function of social support and the incidence of postnatal depression on self-efficacy to new parents after intervention for six months.

The pregnant women who have high self-efficacy, of course, motherly instincts will prepare everything from pregnancy, things related to the process of childbirth and the breastfeeding process that will be lived for ± six months until the baby is ± two years old.

The effect of education by health workers (midwives) is very influential on the level of knowledge, skills, and awareness of pregnant women so that they can become more independent and not dependent on health workers. This can simultaneously improve and strengthen the relationship between pregnant women and midwives to be able to maintain their pregnancies. Increasing the knowledge of pregnant women also obtained through education will be more effective with the modeling approach that is carried out effectively. This can improve the ability to carry out (practice) that affects the confidence in breastfeeding later in the postpartum period and can stimulate the growth of the baby.

**Conclusion**

There were differences in the self-efficacy of pregnant women before and after being given antenatal education about the danger signs of pregnancy, the danger signs of labor and BPCR.

**Ethical Clearance** - Taken from Hasanuddin University Ethics Committee, approval number: 997/H4.8.4.5.31/PP36-KOMETIK/2018.

**Source of Funding** - Self-funding

**Competing Interest** - The authors declared that they have no competing interests.

**Acknowledgment** - We give our gratitude for all respondent that have participated in this study. The authors would like to thank Dr. Sundari for their contributions in preparing and revisions of the manuscript.

**References**


Body Mass Index During Child Development and It’s Association with their Immunity

Qasim Dawood Yasir Altameemi¹, Mohanad Kadhim Mohammed Ali²

¹Assistant Professor and Consultant Pediatrician in Faculty of Medicine, Wasit University, Iraq,
²College of Medicine Wasit University, Kut, Alrabee, Iraq

Abstract

Body mass index (BMI) is used for the assessment of nutritional status in children. The body mass index needs to be adjusted as children grow in size. Various anthropometric parameters are used to predict fatness such as skin folds, circumferences and weight and height. The body mass index parameters also affect the immunity of individual children. The fat children are shown to have a higher risk of cardiovascular diseases. Several studies have shown that the under nutrition is associated with immune depression and increased risk of infections and higher risk of morbidity due to infection.

Keywords: Body mass index, obesity, children immunity, anthropometric parameters.

Introduction

The underweight and obesity definition consists of choosing a suitable cut-off and suitable measure of body fat. There is general agreement for the cut offs for adulthood, which defines grades of nutritional status, in contrast to which in children several definitions are available. Their ECOG (Eastern Cooperative Oncology Group) recommendations and their nutritional descriptions for their use were recently released¹. Body mass index (BMI) is generally used for the assessment of nutritional status. The anthropometric cut-offs need to be adjusted for age as children grow in size. The BMI and other anthropometric measurements description were previously developed in the book of ECOG². Here, we are presenting some steps towards the current methods used and their scientific evidences for selection of method. The single universally applicable, inexpensive non-invasive method is available to assess the size, shape, and composition of the body, which is known as anthropometry. The method reflects both health and nutrition, and predicts risk factor, survival and performance¹. To predict fatness most widely used anthropometric measurements are skin folds, circumferences and weight and height.

Skin fold measurements

In this, subcutaneous fat is assessed, but predicts total body fat percentage⁴. It was established for adults for first time and then adapted for children⁵. These may not be applied to all individuals as they are population specific, especially those with abnormal growth. Regional fat distribution can be assessed from extremity such as triceps skin folds and trunk such as subcapular. In children the skin folds and intra-abdominal adipose tissue (IAAT) relationship is assessed by DEXA⁶. Skin folds recorded at the trunk site are better predictors of cardiovascular risk factors⁷.

Circumferences

In the field of undernutrition they are currently used to assess nutritional status⁸. The Gurney and Jelliffe have developed Formulae based on arm circumference and arm skin folds⁹. For estimating body fat mass they are systematically better than skin folds¹⁰. Both lean and fat compartments are assessed by this method is the main advantage of the method. However fat is underestimated by this traditional method¹¹. In children both circumferences of waist and hip are good predictors of IAAT⁶,⁷.

Corresponding authors
Qasim Dawood Yasir Altameemi
Email: qdawood@uowasit.edu.iq
Phone: +964 771 674 6135

DOI Number: 10.5958/0976-5506.2019.00746.0
Factors affecting body mass index

The current literature says that in relation to parental obesity, about 70% of the obese adolescents become obese in adult life. With regard to the childhood obesity the genetic, epigenetic, environmental factors and inappropriate life-style are greatly contributing to the obesity development and related diseases. As compared to non-obese children, the obese children consumes more fat, thus leading to higher body mass index (BMI).

Weight and height measurements

The World Health Organisation has recommended weight-for-age to assess nutritional status for children. To assess undernutrition Weight-for-age and weight-for-height tables and charts were originally used originally and are still used to assess stunting and wasting.

Correlation between the early child developments with their immunity

Freedman and associates have represented the data that excess of fat in children negatively influences health and/or wellbeing in children, and they have demonstrated that obesity in childhood leads to the risk of cardiovascular events in adult life. The childhood obesity leads to some complications such as triacylglycerols high levels, low levels of cholesterol and high density lipoproteins, and clinical modifications such as defective glucose metabolism and high blood pressure. Obesity is related to inflammation, and on the other hand impaired immunity. In 2009, pandemia of H1N1 influenza the obese individuals were more susceptible. Adipose tissue derived tumor necrosis factor (TNF)-α are produced in large amounts in obese animals in comparison to the lean counterpart. The association between C-reactive protein, interleukin (IL)-6, and the risk of developing type 2 diabetes in obese humans is documented by pradhan et al. In the VAT of obese people macrophages with inflammatory phenotype are detected. Classically activated macrophages are obesity associated macrophages in VAT and they secrete in large amounts TNF-α, IL-6, IL-12, IL-1β, and monocyte chemotactic protein-1 (MCP-1), as well as nitric oxide (NO).

The asthma and allergic diseases prevalence has rapidly increased in western countries over the past decade, and in children and adults this has coincided with increase in overweight and obesity the reasons for this are unfortunately not understood. The immune system is variously affected by the obesity. In allergic diseases that might play a major role. Association between body mass index (BMI) and development of asthma in childhood are demonstrated by several studies. Various national surveys data have shown that nearly half the preschool children in India are underweight, or stunted and <5th are wasted.

Factors affecting BMI and their controls

Digital world

The amount of time spend by a child on Play stations, TV, Mobile and many other digital gadgets directly affects the BMI in children’s. This reduces the daily physical activity of children. This can be control by parental control by assigning a particular time for each activity which leads to their fitness and good health.

Breastfeeding

In the early child development, the babies are more depends on breastfeeding for nutrients and other health benefits. In a study conducted by a research group states that the babies with breast milk are having more immunity with good health and less allergic disease, less prone to infection and many other benefits.

Lifestyle

Western lifestyle has more impact on the people, which tends to change daily routine of parents and children’s. This shows the direct effect on the health of child below the age of 12 years implies the child is more obese or underweight, but in both the conditions the child are more likely to diseases, infection and lower immunity.

Studies evaluating the potential heterogeneity in the development of BMI during childhood are needed to describe the normative and atypical patterns that may emerge early in life. Using 6 assessment points (age 2, 4, 6, 8, 10, and 12 years) and identified 3 developmental trajectories of overweight status among a representative sample (N=2172): early onset (age 2 years, 15.9%), late onset (age 6 years, 7.2%), never overweight (76.9%). This study provides useful information on the ages at which 2 pathologic BMI trajectories emerged. The aims of the present study were to provide new information on the childhood development of obesity.
by identifying children with normative vs atypically elevated trajectories of BMI, using repeated measures of height and weight from 5 months to 8 years, among Iraqi population sample. The second was to identify perinatal factors associated with membership in the atypically elevated developmental group.

The Iran Government’s Health and Social Department had obtained random populations of sample from the families with an infant aged of 5 months in 2013. A stratified 3-stage sampling design was used; the initial target sample of 2172 families was collected from Iran population. Due to nonresponse, inability to contact and for other reasons of rejections out of 2172 only 2536 families were monitored yearly until child was aged 8 years. Of the 2536 participants in the initial sample, we chose to include in the present study only those with 5 or more time points that included height and weight data. This incurred 8.5% attrition. The 1550 families included in the trajectory group estimations differed from the 165 families that were excluded in the proportions of female children (49.7% vs 41.1%), families with insufficient income (22.1% vs 55.6%), and mothers without a high school diploma (17.1% vs 30.9%).

**Group-Based Trajectories of BMI**

By using anthropometric measurement, we have obtained the measures of height and weight, through maternal reports for the child in between the age of 5 months to 5 years from trained interviewer at ages 6, 7, and 8 years.

**Independent Variables**

**Child Characteristics.** Birth weight (categorized as 2500 g, 2500-4000 g, or 4000 g) and gestational age (categorized as >37 weeks or <37 weeks) were obtained from hospital records. Birth rank was categorized as first, second, or third or lower. Temperament at 5 months was measured using 7 items from the Infants Characteristics Questionnaire. Mother’s responses were standardized to a 10-point scale, with higher values representing a more difficult child temperament. Early weight gain was expressed as the difference between weight at 5 months and weight at birth, divided by age (5 months).

**Family Socioeconomic Status and Functioning:** Maternal education and insufficient household income were measures of family socioeconomic status. Family functioning at 5 months was assessed with the 12-item General Functioning subscale of the McMaster Family Assessment Device and was standardized to a 10-point scale, with higher variables on the scale representing less functional households. This scale measures the functionality of the family.

**Analyses**

Group-based developmental trajectories from 5 months to 8 years were identified using a semi parametric mixture model in a trajectory model program. The Bayesian information criterion was used to select the number of trajectory groups that best fit the data. We chose to estimate each possible combination of trajectory shapes (curvilinear, quadratic, or cubic) in a 2-, 3-, and 4-trajectory model to identify the model maximizing the Bayesian information criterion and maintaining parsimony. The model was determined without a priori hypotheses regarding the existence of distinct trajectories, their number, or shape. The 2 main outputs from the trajectory model estimation are the shape of each group’s trajectory and the probabilities of group membership. The program uses the latter to classify individuals into the trajectory groups. Trajectory models were estimated separately for each sex, and the resulting curve measurements were examined to identify potential differences in either the levels or the developmental patterns of BMI. Logistic regression analyses were used to examine the capacity of the risk factors to distinguish membership in the atypically elevated trajectory group vs the other groups while controlling for the levels of the other risk factors. Each variable that had been excluded because of a high P value in bivariate analysis was entered one-by-one into the basic logistic model to verify any potential effects. The final logistic regression analysis included 1849 children.

**BMI Trajectory Models**

![Figure 1. Body mass index (BMI) trajectory groups. Solid lines represent observed values, and dashed lines represent expected values.](image-url)
Three distinct groups were identified (Figure 1): low stable BMI (54.5%), moderate BMI (41.0%), and high-rising BMI (4.5%). The moderate and low-stable trajectory groups showed a similarly shaped developmental pattern, with BMI values of the moderate group being higher at each time point. The high rising trajectory was not distinguishable from the other 2 groups between age 5 months and 2.5 years. Between 3.5 and 8 years, children in the high-rising group exhibited increasingly higher BMI, reaching a mean BMI of 24 at 8 years. From 5 years onward, the high-rising group was composed of more than 50% of children with BMI values exceeding the cutoff value for obesity defined by the International Obesity Task Force. We identified differences in the proportions, but not the patterns, of the BMI trajectories modeled separately by sex. As a result, we modeled the development of BMI with the 2 sexes in the same model and controlled for sex in multivariate analyses.

Ethical Clearance: Ethical Clearance was taken from research committee in Alzahraa teaching hospital in kut- Wasit (Research article)

Conflict of Interest: Nil

Funding Source: Self

References


Regional Longitudinal Strain by Speckle Tracking Echocardiography in Coronary Artery Disease

Saeed H. Lafta1, Mohammad Saeed A.2, Khalid E. Amber3

1Medical Physiology, Resident in Medical physiology, Kufa Faculty of medicine, university of Kufa, 2Assistant. Prof. Faculty of Medicine/ University of Kufa, 3Consultant Interv. Cardio. FACC, FESC, Al-Sadr Hospital / Al-Najaf cardiac center

Abstract

Speckle-tracking echocardiography (STE) is a new non-invasive ultrasonic imaging method that allows an objective and quantitative valuation of regional and global function of myocardium independently from heart translational movements and insonation angle through estimation of longitudinal strain both regional & global. Although MRI may be considered the reference standard in estimating myocardial deformation, its routine use is limited by its high costs, poor accessibility, relative difficulty of acquisitions, and time consuming. Longitudinal strain offers a quantitative assessment of myocardial deformation of each left ventricular segment, also permits early systolic dysfunction detection in patients with a preserved LVEF.

This may help in predicting IHD through non-invasive method. In the present study, we tried to assess accuracy of STE compared to conventional coronary angiography.

Study design is Cross sectional survey, conducted in the open heart Center of Al-Sadr Hospital; Najaf City. Study population was Patients with Ischemic heart disease referred for conventional coronary angiography. In this study, 228 patients; age range was 37-77 years, with a mean of 56.71±9.736 years. Of them 65%were males. The sensitivity of STE was 95.3%, specificity was 75%, PPV was 95.3%, NPV was 75%, and accuracy rate was 92.1%. Significant correlation between RLS for the basal and mid part of the main six segments and the culprit artery (P value = 0.0001)

Keywords: Ultrasonic imaging, Speckle-tracking echocardiography, Regional longitudinal strain

Introduction

Assessment of cardiac strain rate (SR) and strain are recent catalogs that have the probable to resolve these restrictions. SRs and strain symbolize the rate and greatness correspondingly of myocardial distortion, which is an energy needful procedure that happens in together diastole and systole. Defects of myocardial distortion are realized prematurely in the growth of numerous pathophysiologic conditions, counting ischemic condition, and therefore deliver a subtle income for noticing local myocardial dysfunction1,2.

Myocardial Strain:

During current period, dislocation imaging, distortion imaging, and velocity imaging (strain-rate and strain imaging) have seemed as valued apparatuses for further reliable and inclusive echocardiographic calculation of myocardial performance 1. The Contract strain can be either negative, which shows shortening, or positive, which shows lengthening. Values are negative numbers for usual longitudinal and circumferential strain, while positive values are for radial strain. The alteration in strain by time is just SR (i.e., the rate of distortion, or exactly, the time-based derivative of strain), its unit is s⁻¹. Contrariwise, assimilating SR values over time computes strain. The quantity of deformation (negative or positive strain) is typically stated in percent. The negative strain values define shortening, while the positive strain values define thickening, of a specified cardiac part correlated to its initial length. Throughout myocardium contractility, for instance the myocardium shortens it also thickens and therefore all parameters valuation, of circumferential shortening (negative
strain), longitudinal shortening (negative strain), and radial thickening (positive strain), is beneficial for the assessment of contractility purpose.

Two-D speckle tracking (2D STE) evaluate myocardial movements via frame-by-frame following of natural acoustic indicators i.e. tracking (= 20 to 40 pixels in size and inconsistently denoted like fingerprints designs, or speckles).

Figure 1. (A) Normal and (B) abnormal, 2D STE radial strains.

However, in patients with myocardial infarction and cardiomyopathy, SR and strain gained by 2D STE and DSI were powerfully connected. Since SRs and strains are consistently spread through the myocardial tissue, the discovery of even delicate variations in any degree advises myocardial deformities. The average of segmental longitudinal strains (longitudinal global strain) -17.4% delivered great specificity and sensitivity (77%and 83%, respectively) in recognizing cases with obstructive CAD. Strain rate and strain techniques seemed to be highly predictive pointers for subclinical cases, comprising, systemic sclerosis, diabetes mellitus, hypertensive patients, IHD, insulated regurgitation of mitral valve, cardiomyopathies and aortic regurgitation, and moreover very beneficial for the valuation of damaged myocardial tissue after ischemia, revascularization efficacy assessment and detection of case outcome with HF. Newly describe that two dimensional-STE Strain technologies is extremely sensitive for the prompt recognition of cardiac deformities caused by doxorubicin, and there is association between decreased radial strains in cases who suffered chemotherapy with doxorubicin with histologic markers of doxorubicin cardiomyopathy. Strain rate and strain valuation also seem to be beneficial in athletics for the assessment systolic function of left ventricle in athletes.

Patients and method

Patients

This cross sectional study was directed on cases with coronary artery disease (CAD), who were admitted to Al-Sadr Hospital at Al-Najaf Governorate, at May 2017 to the end of Feb. 2018. All patients undergone 2D speckle tracking echocardiography (STE) by Regional longitudinal peak strain (RLPS), followed by conventional coronary angiography, to assess the diagnostic accuracy of STE.

Inclusion criteria:

(a) Diagnosis of IHD rendering to the guidelines in managing of ACS (b) Clinically established condition; (c) Absence of other significant cardiopulmonary disease or comorbidity and (d) Normal ejection fraction values (≥55% in males and females) at the time of the evaluation.

Exclusion criteria:

(a) Current heart failure; (b) Congenital heart disease; (c) Diabetic patients; (d) Previously stented patients; (e) Valvular heart disease; (f) conduction abnormalities on ECG and (h) Greater than mild LV hypertrophy and sign of cardiomyopathy.

Echocardiography:

All patients had a resting echocardiography with commercially available transthoracic echocardiography Vivid E9 GE vingmed ultrasound in open heart center in AL Sadder hospital.

Methods:

Starting an examination:

1. We press patient on the control board.
Patient option is showed.

2. Then from patient window we select the desired data flow.

3. We write the patient last name, and, or ID.

4. To create a new case record, choose Create patient.

Automated Functional Imaging:

The option that supports regional valuation of the LV systolic function is an automated functional imaging (AFI). AFI is an option resulting from 2D Strain, which computes the myocardial distortion grounded on character tracking on 2D grey scale board. Bull’s eye exist the result by viewing color noted and mathematical standards for peak systolic LS. The result can also be presented as a Bull’s eye with a score index (Auto scoring). All results are kept to the worksheet.

Coronary Angiography (CA)

Through femoral approach the percutaneous coronary Angiography (CA) was achieved. CA was gained for every coronary vessel in more than two predictions, and occlusion with more than 70% decrease in the vessel diameter zone was regarded important. The evaluation of the CA was achieved by eye of a skilled user who was blinded to the outcomes of the 2D STE analyses.

Results

This study contain 228 patients, the range of their ages is 37-77 years, with a mean of 56.71±9.736 years. Among those patients there were 147 males and 81 females, Table (2) shows the specificity, sensitivity, negative and positive predictive values, prevalence and accuracy rate of STE as compared to coronary angiography. The sensitivity of STE was 95.3%, specificity was 75%, PPV was 95.3%, NPV was 75%, and accuracy rate was 92.1%.

Regarding the regional longitudinal strain of STE, Table (3) shows the values of basal, mid and apical speckle tracking echocardiography and their segments. A statistical significance was found regarding basal and mid STE (P-value for each of them equals to 0.0001), while for apical STE, no statistical significance was found there (P-value = 0.247). In tables (5) show the segmental distribution of the sample study according to coronary catheterization results numbers, percent’s and

P values. In table 4 shows the spreading of the sample rendering to age group

| Table 1. Specificity, Sensitivity, positive and negative predictive values, and accuracy rate of STE compared to CA. |
|----------------|----------------|----------------|
|                | STE            | CATH           |
|                | Positive       | Negative       | Total         |
|                | No.            | 183            | 9             | 192           |
| Positive       | % within STE   | 95.3%          | 4.7%          | 100.0%        |
|                | % within CATH  | 95.3%          | 25.0%         | 84.2%         |
| Negative       | No.            | 9              | 27            | 36            |
|                | % within STE   | 25.0%          | 75.0%         | 100.0%        |
|                | % within CATH  | 4.7%           | 75.0%         | 15.8%         |
| Total          | No.            | 192            | 36            | 228           |
|                | % within STE   | 84.2%          | 15.8%         | 100.0%        |
|                | % within CATH  | 100.0%         | 100.0%        | 100.0%        |

Sensitivity : 95.3%
Specificity : 75%
Positive PV : 95.3%
Negative PV : 75%
Accuracy rate : 92.1%

Table 2. Values of basal, mid and apical STE and their segments
Table 3. Spreading of the study sample rendering to Age Group

<table>
<thead>
<tr>
<th>Age</th>
<th>CATH positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>37-47</td>
<td>36</td>
<td>18.8</td>
<td>0</td>
</tr>
<tr>
<td>48-57</td>
<td>66</td>
<td>34.4</td>
<td>19</td>
</tr>
<tr>
<td>58-67</td>
<td>69</td>
<td>35.9</td>
<td>15</td>
</tr>
<tr>
<td>68-77</td>
<td>21</td>
<td>10.9</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td></td>
<td>36</td>
</tr>
</tbody>
</table>

P. value = 0.001

Table 4. Distribution of the study sample findings according to different segments.

<table>
<thead>
<tr>
<th>Variable No.</th>
<th>Positive (N = 192)</th>
<th>Negative (N = 36)</th>
<th>Total</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Anteroseptal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>138</td>
<td>71.9</td>
<td>6</td>
<td>16.7</td>
</tr>
<tr>
<td>Negative</td>
<td>54</td>
<td>28.1</td>
<td>30</td>
<td>83.3</td>
</tr>
<tr>
<td>Inferior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>165</td>
<td>85.9</td>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td>Negative</td>
<td>27</td>
<td>14.1</td>
<td>33</td>
<td>91.7</td>
</tr>
<tr>
<td>Lateral</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>135</td>
<td>70.3</td>
<td>15</td>
<td>41.7</td>
</tr>
<tr>
<td>Negative</td>
<td>57</td>
<td>29.7</td>
<td>21</td>
<td>58.3</td>
</tr>
<tr>
<td>Posterior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>153</td>
<td>79.7</td>
<td>13</td>
<td>36.11</td>
</tr>
<tr>
<td>Negative</td>
<td>39</td>
<td>20.3</td>
<td>23</td>
<td>63.89</td>
</tr>
<tr>
<td>Septal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>156</td>
<td>81.3</td>
<td>6</td>
<td>16.7</td>
</tr>
<tr>
<td>Negative</td>
<td>36</td>
<td>18.8</td>
<td>30</td>
<td>83.3</td>
</tr>
</tbody>
</table>

P. value = 0.001

Discussion

As pointed out by Feigenbaum*, despite STE viability and probable of value clinical practice, until now just a little academic centers have merged it into daily clinical of echocardiography, then on a restricted foundation. By outcome of this study was agreed with our research since, The ideal cut-off degree for recognizing cases with CAD+ was -15.4 % for Regional LS with a specificity / sensitivity / +ve predictive value (PPV) and / -ve PV (NPV) / prevalence /accuracy rate of 75 % / 95.3% / 95.3 % / 75 % / 84.2% / 92.1% respectively. In conclusion, valuation of regional-detailed strain by 2D-STE might detect cases with CAD. Endocardial performance was establish to be further influenced in CAD+ matched with epicardial performance and LV-EF, so our study describes GLS and RLS had good predictor for early stages of CAD. The disease ACS and other problems of atherosclerosis are mostly difficulties of mid-age and older patients; however atherosclerosis is a life-long disease. Presence of fatty streaks is common in people post puberty, and fibro-atheroma is common from age of 30 years and older*. Demographic statistics of the studied cases as concern to degree of CAD, it displayed statistical significant differences among CAD and normal in concern of age (p value 0.001) as in table of age grouping (4) and in terms of gender, there is statistical significant differences (p value 0.002). In This study GLS and RLS of 2D STE have no difference than other non-invasive diagnostic tools and invasive technique (cath.) in prediction of CAD since there is high sensitivity/specificity value (95.3%/75%), with
accuracy rate of 92.1%. Regional longitudinal strain (RLS) was measured like the mean of the parts related to each territory supply of the three main coronary blood vessels\(^{10}\). In comparison to our study using peak systolic strain for global and regional longitudinal strain had very good range of AUC and highly significant p value in predict CAD and +LR was more than one (1.2 to 1.55) while – LR below one (0.71 to 0.82) that indicate high accuracy and validity of STE in diagnosing CAD. This study explains why apical segments in our study have non-significant p value (0.247), while other segments and their subdivision had high significant value (0.0001) while distribution of the study sample according to the coronary angiography is highly significant p value for all segments apart from septal and inferior areas as shown in tables (5, 6, 7, 8, 9, and 10) that may be due to some segments have variable coronary perfusion. High positive predictive value and sensitivity resulted by the use of RLS thresholds for diagnosing CAD. It is smart to arrange that dependable RLPS cutoffs might theoretically replace the requirement for supplementary non-invasive stress testing in sub-optimal clinical situations in some cases. Also in this study the calculation of RLS and GLS are shows suggestively higher values i.e. lower negative in cases with CAD+ in comparison with those in CAD-. The usage of BE for Regional LS calculation is resulting via the last GE apparatus. In the 2002 references separate sections were gathered and shared gave to precise territories of coronary blood vessels, even though there is separate variation in the perfusion of coronary artery to cardiac sections.

**Conclusion**

“In this study displays that regional distortion assessment of resting echocardiograms can identify CAD with diagnostic power similar to traditional scoring of wall motion achieved through echocardiography. That result may have significant clinical effects by possibly recognizing CAD in an otherwise non-diagnosed and non-treated people and may be a supportive aide to traditional echocardiography in stratifying cases. These facts enhance the collecting confirmation that resting two dimensional speckle tracking echocardiography is a potent diagnostic method that may (i) “rise the sensitivity and diagnostic accurateness of Echo. study (ii) supplement traditional ventricular movement valuation (iii) replace the requirement for further aggressive or non-aggressive investigation for particular cases with sub-optimal stress examination and (iv) aid in recognize cases who would advantage from modification strategy of an forceful risk factor that could be missed. The high positive PV and specificity for identifying coronary artery disease result from the use of GLS thresholds. It is good-looking to arrange that dependable GLPS cut-offs might theoretically replace the requirement for supplementary non-aggressive stress examination in sub-optimal clinical situations in particular cases. The usage of left ventricle and right ventricle GLPS is suggested in furthermore new guidelines for the measureable valuation of RV and LV performance. Serialized measurements in a discrete case should be approved by usage of the same software and vendor machine.

**Ethical Clearance:** The Official agreement was obtained from the Kufa university prior to initiation of the study, data were collected in accordance with the Helsinki declaration of WMA 2013.

**Conflict of Interest:** None

**Source of Funding:** None, Self-funded

**References**


Global Longitudinal Strain Accurateness in Prediction of Ischemic Heart Disease

Saeed H. Lafta¹, Mohammad Saeed A², Khalid E Amber³

¹MBChB, MSc. Medical Physiology, Resident in Medical physiology, Kufa Faculty of Medicine, University of Kufa, ²MBChB, CABM, Assist. Prof. Faculty of Medicine/ University of Kufa, ³Consultant Interv. Cardio. F ACC, FESC, Al-Sadr Hospital / Al-Najaf cardiac Center

Abstract

Calculation of longitudinal movement and distortion are consequently the major subtle indicators particularly in cases with coronary disease. A non-invasive, simple technique to get better assortment of cases that are denoted for coronary artery is potentially needed. The aim of the present study is to assess the accuracy of diagnosis by global longitudinal strain, (GLS) gained by speckle tracking echocardiography (STE) in estimation of the existence, degree and severity of coronary artery disease in comparison to conventional coronary angiography. A Cross sectional survey, conducted in the open heart Center of Al-Sadr Hospital; Najaf City. In this study, 228 patients; age range was 37-77 years, with a mean of 56.71±9.736 years. Of them 65% were males. The sensitivity of STE was 95.3%, specificity was 75%, PPV was 95.3%, NPV was 75%, and accuracy rate was 92.1%. The mean cutoff point of GLPS was -15.39 while +LR was 3.86 and -LR 0.33. ROC analysis generally revealed that good and very good AUC value for the six main segments also the same thing for the sub segments while AUC of GLPS was 0.748. In conclusion, goodness of the diagnostic test and there is no difference from the gold standard method in addition STE have no serious complication on the patients.

Keywords: Ischemic heart disease, echocardiography, global longitudinal strain

Introduction

The echocardiographic valuation of local myocardial function displays an important part in the examination and treatment of coronary artery ischemia or (IHD) and in maximum of studies depends on the necked eye finding of endocardial wall movement defects and valuation of LV ejection fraction. Since cardiac geometry of 3D and multifaceted arrangements of myofiber, there are several modules or ways of strain (radial, longitudinal and circumferential) that may be usual (i.e., perpendicular or orthogonal) or shear. The track of highest distortion is named the main strain¹. Two-D speckle tracking (2D STE) evaluate myocardial movements via frame-by-frame following of natural acoustic indicators i.e. tracking (= 20 to 40 pixels in size and inconsistently denoted like fingerprints designs, or speckles)². Frame rate is a significant issue in STE. In 2D STE applications concerning normal heart rates have been used frame rates of 40 to 80 frames/sec; higher frame rates may be necessary to track myocardium in hearts with tachycardia³. Accuracy of diagnosis for significant coronary artery disease was matched between coronary angiography and strain analysis by map of bull’s-eye⁴. Since SRs and strains are consistently spread through the myocardial tissue, the discovery of even delicate variations in any degree advises myocardial deformities ⁵. The average of segmental longitudinal strains (longitudinal global strain) -17.4% delivered great specificity and sensitivity (77%and 83%, respectively) in recognizing cases with obstructive CAD ⁶, ⁷. Strain rate and strain techniques seemed to be highly predictive pointers for subclinical cases, comprising, systemic sclerosis, diabetes mellitus, hypertensive patients, IHD, insulated regurgitation of mitral valve, cardiomyopathies and aortic regurgitation, and moreover very beneficial for the valuation of damaged myocardial tissue after ischemia, revascularization efficacy assessment and detection of case outcome with HF ².
Patients And Method

Patients

This cross sectional study was directed on cases with coronary artery disease (CAD), who were admitted to Al-Sadr Hospital, (May 2017 to the Feb.2018). All patients undergone 2D speckle tracking echocardiography (STE) by global longitudinal peak strain (GLPS), followed by conventional coronary angiography, to assess the diagnostic accuracy of GLPS.

Inclusion criteria:

Patients of both genders, with IHD diagnosis rendering to the guidelines in managing of ACS, clinically established condition, absence of other significant cardiopulmonary disease or comorbidity and normal ejection fraction values (55% or more) at the time of the evaluation.

Exclusion criteria:

Patients with one or more of the following were excluded from the study; current heart failure; congenital heart disease, diabetic, previously stented, valvular heart disease, conduction abnormalities on ECG or greater than mild LV hypertrophy and sign of cardiomyopathy.

Echocardiography

All patients had a resting echocardiography with commercially available transthoracic echocardiography Vivid E9 GE vingmed ultrasound A/S.

Methods

Starting an examination:
1. We press patient on the control board.
   Patient option is showed.
2. Then from patient window we select the desired data flow.
3. We write the patient last name, and, or ID.

Ending an examination
1. We press Patient on the screen.
2. We choose End Exam on the Touch screen.
3. Select:
   - All: to store all images and end the exam.
   - None: to end the exam without storing any images.

Starting AFI

Starting AFI from sequential acquisition by
1. From APLAX view and choose Measure.
2. From Measure. Menu, choose AFI.

Longitudinal GS degrees for all 3 windows at the apex. In a given view the Global Strain (GS), also called Global Longitudinal Peak Strain (GLPS), is defined as the percentage of maximal contraction over the whole cardiac cycle of the entire myocardial wall relative to its end diastolic length. When the tracking is complete in the A2-ch. the Bull’s Eye and Traces screen with segmental curves is showed.

Coronary Angiography (CA)

Through femoral approach the percutaneous coronary Angiography (CA) was achieved. CA was gained for every coronary vessel in more than two predictions, and occlusion with more than 70% decrease in the vessel diameter zone was regarded important. The evaluation of the CA was achieved by eye of a skilled user who was blinded to the outcomes of the 2D STE analyses.

Results

The age of the 228 patients ranged 37-77 years, with a mean of 56.71±9.736 years. Furthermore, age distribution into categories revealed that majority of the patients aged more 47 years. Among the studied group males were dominant, 147/228 represented 64.5% while females were 81 (35.5%), (Table 1)

The specificity, sensitivity, negative and positive predictive values, prevalence and accuracy rate of STE as compared to coronary angiography. The sensitivity of STE was 95.3%, specificity was 75%, positive predictive value (PPV) was 95.3%, negative predictive value (NPV) was 75%, and accuracy was 92.1%, (Table 2).

The distribution of the sample according to coronary angiography and gender is shown in (Table 3). In table 4 the spreading of the sample rendering was reported according to age groups
Table 1. Age and gender distribution of the studied group

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>147</td>
<td>64.5</td>
</tr>
<tr>
<td>Female</td>
<td>81</td>
<td>35.5</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37-47</td>
<td>36</td>
<td>15.8</td>
</tr>
<tr>
<td>48-57</td>
<td>87</td>
<td>38.2</td>
</tr>
<tr>
<td>58-67</td>
<td>84</td>
<td>36.8</td>
</tr>
<tr>
<td>68-77</td>
<td>21</td>
<td>9.2</td>
</tr>
<tr>
<td>Total</td>
<td>228</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2. Validity parameters and prevalence rates of STE compared to CA

<table>
<thead>
<tr>
<th>STE</th>
<th>CATH Positive</th>
<th>CATH Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>No.</td>
<td>183</td>
<td>9</td>
</tr>
<tr>
<td>% within STE</td>
<td>95.3%</td>
<td>4.7%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% within CATH</td>
<td>95.3%</td>
<td>25.0%</td>
<td>84.2%</td>
</tr>
<tr>
<td>Negative</td>
<td>No.</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>% within STE</td>
<td>25.0%</td>
<td>75.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% within CATH</td>
<td>4.7%</td>
<td>75.0%</td>
<td>15.8%</td>
</tr>
<tr>
<td>Total</td>
<td>No.</td>
<td>192</td>
<td>36</td>
</tr>
<tr>
<td>% within STE</td>
<td>84.2%</td>
<td>15.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>% within CATH</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Sensitivity = 95.3%
Specificity = 75%
Positive PV = 95.3%
Negative PV = 75%
Accuracy rate = 92.1%

Table 3. Distribution of the studied group according to coronary angiography findings and gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Positive</th>
<th>Negative</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Male</td>
<td>132</td>
<td>68.8</td>
<td>15</td>
</tr>
<tr>
<td>Female</td>
<td>60</td>
<td>31.3</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td>84.2</td>
<td>36</td>
</tr>
</tbody>
</table>

P. value = 0.002
Table 4. Spreading of the study sample rendering to Age Group

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Positive</th>
<th></th>
<th>Negative</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>37-47</td>
<td>36</td>
<td>18.8</td>
<td>0</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>48-57</td>
<td>66</td>
<td>34.4</td>
<td>19</td>
<td>58.3</td>
<td>87</td>
</tr>
<tr>
<td>58-67</td>
<td>69</td>
<td>35.9</td>
<td>15</td>
<td>41.7</td>
<td>84</td>
</tr>
<tr>
<td>68-77</td>
<td>21</td>
<td>10.9</td>
<td>0</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td>84.2</td>
<td>36</td>
<td>15.8</td>
<td>228</td>
</tr>
</tbody>
</table>

P. value = 0.001

Table 5. Area Under Curve (AUC) & quality of test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>AUC</th>
<th>Quality of Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>0.708</td>
<td>Good test</td>
</tr>
<tr>
<td>Anteroseptal</td>
<td>0.760</td>
<td>Good test</td>
</tr>
<tr>
<td>GLPS</td>
<td>0.748</td>
<td>Good test</td>
</tr>
<tr>
<td>Inferior</td>
<td>0.793</td>
<td>Good test</td>
</tr>
<tr>
<td>Lateral</td>
<td>0.706</td>
<td>Good test</td>
</tr>
<tr>
<td>Posterior</td>
<td>0.800</td>
<td>Very Good test</td>
</tr>
<tr>
<td>Septal</td>
<td>0.757</td>
<td>Good test</td>
</tr>
</tbody>
</table>

Validity parameters

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cutoff point</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>-LR</th>
<th>+LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior</td>
<td>16</td>
<td>71.9</td>
<td>66.7</td>
<td>0.42</td>
<td>2.18</td>
</tr>
<tr>
<td>Anteroseptal</td>
<td>17</td>
<td>78</td>
<td>83.3</td>
<td>0.26</td>
<td>4.19</td>
</tr>
<tr>
<td>GLPS</td>
<td>12</td>
<td>73.4</td>
<td>77.77</td>
<td>0.34</td>
<td>3.29</td>
</tr>
<tr>
<td>Inferior</td>
<td>15</td>
<td>85.9</td>
<td>91.7</td>
<td>0.15</td>
<td>10.34</td>
</tr>
<tr>
<td>Lateral</td>
<td>17.5</td>
<td>70.3</td>
<td>68.3</td>
<td>0.43</td>
<td>2.21</td>
</tr>
<tr>
<td>Posterior</td>
<td>15.75</td>
<td>79.7</td>
<td>63.89</td>
<td>0.31</td>
<td>2.21</td>
</tr>
<tr>
<td>Septal</td>
<td>14.5</td>
<td>81.3</td>
<td>83.3</td>
<td>0.22</td>
<td>4.86</td>
</tr>
</tbody>
</table>

DISCUSSION

The ideal cut-off degree for recognizing cases with CAD+ was −15.4 % for Global LS with a specificity / sensitivity / +ve predictive value (PPV) and / -ve PV (NPV) / prevalence/accuracy rate of 75% / 95.3% / 95.3 % / 75 % / 84.2% / 92.1% respectively. In conclusion, valuation of Global-detailed strain by 2D-STE might detect cases with CAD. Endocardial performance was establish to be further influenced in CAD+ matched with epicardial performance and LV-EF, so our study describes GLS had good predictor for early stages
of CAD. Demographic statistics of the studied cases as concern to degree of CAD, it displayed statistical significant differences among CAD and normal in concern of age (p value 0.001) and in terms of gender, there is statistical significant differences (p value 0.002).

Retrospective study of Montgomery evaluated two dimension-STE structures in 123 successive cases that experienced stress echocardiography, and then CA through 10 days. This study agrees with our study that GLPS of 2D STE have no difference than other non-invasive diagnostic tools and invasive technique (cath.) in prediction of CAD since there is high sensitivity/ specificity value (95.3%/75%), with accuracy rate of 92.1%. ROC analysis generally reveals that good and very good AUC value for the six main segments also the same thing for the sub segments. goodness of the diagnostic test and there is no difference from the gold standard method in addition STE have no serious complication on the patients. In this study the positive CAD is distinct as more than 70% reduction in lumen of the arteries, which resembles to 50% decrease in diameter of the arteries.

We concluded that measurements of GLS at rest have modest accurateness of diagnosis in expecting CAD+ in cases complaining from chest discomfort. The ideal diagnostic cutoff value of GLS differs from preceding studies might be described by GLS may rely on their hemodynamic factors (i.e., blood pressure) through pictures acquirement, the consequence of diastolic function and the clinical features of patients by usage of different apparatus, varying project, seller-dependent two dimension speckle tracking echocardiography software and user experience. The predictive powers of strain parameters are showed by ROC plots. It Displays the ROC performance facts with the p-value and AUC for the equivalent specificity and sensitivity at the operative cut-off values. Of note, STE by GLPS had great peak sensitivity/specificity (95.3/75%) combination. The area under the curve was 0.748, which is a good and highly significant P value (0.0001) also had highly +LR (3.86) and –LR (0.33) that is indicate goodness of GLPS in detecting CAD. We notice global and regional strain cut-offs that identify the existence of more than 50% occlusion at rest with resemble diagnostic accurateness like traditional scoring of ventricular movement. In addition to that we found the GLS diagnostic accuracy at rest is equivalent in expressions of specificity and sensitivity to that RLS. In our study the diagnostic accuracy displays an Area under the curve that is resemble to those found when two dimensional STE was achieved. Our sensitivity assessment that applied an onset of more than 70 % CAD stenosis displayed that GLS defects which are obvious at rest also in the cases of non-obstructed CAD, and that GLPS degree of ≤ -20% are rare in cases with any grade of vital artery occlusion. Similarly a GLPS degree more than -15% is usually connected with significant CAD.

**Conclusion**

In this study displays that global distortion assessment of resting echocardiograms can identify CAD with diagnostic power similar to traditional scoring of wall motion achieved through echocardiography. That result may have significant clinical effects by possibly recognizing CAD in an otherwise non-diagnosed and non-treated people and may be a supportive aide to traditional echocardiography in stratifying cases. An inclusive study is necessary to additional appreciate the effort that consider the global distortion may have as a diagnostic device in those people. It is good-looking to arrange that dependable GLPS cut-offs might theoretically replace the requirement for supplementary non-invasive stress examination in sub-optimal clinical situations in particular cases. Extraction of GLS via windows at the apex is the maximum forceful and reliable of entirely left ventricle distortion parameters and has been revealed to be a potent diagnostic and prognostic method. The usage of left ventricle and right ventricle GLPS is suggested in furthermost new guidelines for the measurable valuation of RV and LV performance.

**Ethical Clearance:** All official agreements were obtained from the university of Kufa, A verbal and signed consent obtained from each participant, and the data collected according to the declaration of Helsinki 2013

**Conflict of Interest:** None

**Source of Funding:** None, Self-funded

**References**


2. Reisner S, Lysyansky P, Agmon Y, Mutlak D,


Assessment of the Antineoplastic Effects of the Investigational Agent PAX2M as C-MYC Onco-Protein Blocking Agent in Human Colorectal Cancer Cells Model Sw480 Cell Line

Sarah Mazin Naeem1, Hussein A. Abdulkadhim2, Kifah J. Shaker3, Hamid N. Obied4

1B.Sc. Pharmacy, Department of Pharmacology and Therapeutics, College of Medicine, University of Kufa, 2ChB MSC, PhD Pharmacology and Therapeutics, Assistant Professor, Department of Pharmacology and Therapeutics, College of Medicine, University of Kufa, 3PhD genetic engineering and biotechnology, Assistant Professor, Cancer Research Unit, College of Medicine, University of Kufa, 4Lecturer, Department of Pharmacology and Toxicology, College of Medicine, University of Babylon

Abstract

MYC modifies the expression of many genes, and the deregulated expression of C-MYC represents a hallmark feature of cancer because most, if not all, human cancers have a deregulation in C-MYC and associated with poor prognoses. The Primary human colorectal carcinomas were enormously associated with C-MYC overexpression. This study involved an assessment of the cytotoxic effects of PAX2M, a direct C-MYC oncoprotein blocking agent, in a colorectal cancer cell line, and the evaluation of its safety in the normal tissue cell line. The results indicate a significant reduction in the cells viability at the dose-dependent fashion moreover, PAX2M displayed a lower toxicity in normal cells The investigational agent PAX2M described in this study that directly targets C-MYC oncoprotein is likely to be a promising therapeutic agent for colorectal cancer treatment.

Keywords: C-MYC targeting therapy, colorectal cancer, antineoplastic drugs, crystal violet assay, cell line.

Introduction

Colorectal cancer represents the most popular type among the gastrointestinal cancers1. The MYC family oncogene is deregulated, in more than 50% of human cancers, and this deregulation is extremely synchronized with poor prognosis and unwanted patient survival.2 MYC overexpression occurs in approximately 70% of human primary colorectal carcinomas3. MYC was featured in the cancer-affined deaths of a predestined 100,000 people in the United States, in addition to millions worldwide, every year4. Targeting MYC or its pathways therapeutically was emerged as a very attractive approach and having a significant attention to participate in cancer interventions5. Therefore, several strategies were directed toward the inhibition of MYC aimed to develop efficient therapies against cancer. C-MYC inhibitors are still subjecting to preclinical experiments except for some agents which under clinical trial in limited types of cancers, so currently the presence of clinically-viable MYC inhibitor are wanting6. Methotrexate (MTX) act by limited the synthesis of thymidine and purine nucleotides and the high-dose methotrexate can disturb synthesis and repair of DNA and cell division7. Methotrexate was selected in this study due to its action on the cell cycle, and the investigational agent PAX2M also interact with cell cycle events. Most patients who have been taking methotrexate are more likely to arrest therapy due to the adverse effects of this medication rather than lack of efficacy8.

Materials and Method

Cell Lines

The human colorectal cancer cell line SW480 and the normal kidney epithelial cell line VERO were cultivated in RPMI-1640 medium supplemented with 10% FBS, 100 U/ml penicillin and 100mg/ml streptomycin. All cells were free of pathogenic contamination and cultured as a monolayer in a 37°C incubator and 5% CO29.

Drugs

The two-fold serial dilutions from each of the two agents PAX2M and MTX was made at concentrations of (1000, 500, 250, 125, 62.5, 31.25, 15.625, and 7.8125)
µg/ml by solubilizing them in serum-free RPMI 1640 culture media.

**In vitro cytotoxicity assessment with crystal violet assay**

The crystal violet assay was performed according to the protocol of Feoktistova and his colleagues.\(^\text{10}\)

Pre-drug exposure cellular handling

When the cells of SW480 and VERO lines (at the passage number 8 and 13 respectively) reached 70-80% confluence growth, they were trypsinized, counted, and resuspended in warm RPMI 1640 cultivation medium and seeded in sterile flat bottom 96-wells plates. 200µl of cell suspension /well and incubated for 25 hours at 37°C and 5% CO2 incubator to enable the cells to attach to the well.

Cellular drugs exposure

Next day, the medium was aspirated from the plates and then they were treated with the new fresh sterile serum-free RPMI medium which was previously prepared and supplemented with scalar concentrations each of the tested agent’s PAX2M and MTX that ranged from 1000 to 7.8125 µg/ml, and a three control wells were incubated with only culturing medium without any drug or additives. The plates after that were incubated in 37°C for 24 - 26 hour.

**Staining with crystal violet dye**

After target treatments incubation time had been finished, the wells were washed with PBS, then 50µl of 0.5% crystal violet stain solution was poured to each well then the plates were incubated in 25°C for 20 min. The plates were then gently washed with tap water and dried. After that, 200µl of methanol was administered to each well then the plates were incubated at room temp for 20 min with gentle rocking, finally the optical density of each well was read at 570 nm, with a plate reader (HumaReaderHS) and the average OD\(_{570}\) of the 3 wells without cells (blank wells) was subtracted from the OD\(_{570}\) of each well in the plate.\(^\text{10}\)The cellular growth inhibition was calculated according to the following equation.\(^\text{11}\)

Dose-response curve and determination of IC50

The dose-response curve relationship was utilized for describing the changes in the cellular growth inhibition of SW480 and Vero cells in response to various dose levels of PAX2M and MTX after a certain exposure time.

The IC50 was extrapolated from the dose-response graph as the concentration of the drug that reduced the viability by 50% represents the IC50.\(^\text{12}\)

**Statistical analysis:** Statistical analysis was performed using one way ANOVA technique for comparisons between groups followed by post-hoc tests using LSD. The P<0.05 was considered to be statistically significant; the data were expressed as mean ± standard error (SE).

**Results**

The overall results of the cytotoxicity assessment with crystal violet assay revealed by the tested agents PAX2M and MTX indicated that there was a highly significant reduction (p< 0.05) in the cellular growth inhibition of SW480 and VERO cells between the untreated (control) cells and the cells exposed to different dose levels of each tested agent. The PAX2M IC50 value was 93.28µg/ml. The cellular growth inhibition mode was in a dose-dependent manner, by which the SW480 cells growth inhibition decreased by increasing PAX2M concentration.

**Table 1. Percent of SW480 cells growth inhibition for PAX2M.**

<table>
<thead>
<tr>
<th>Concentration (µg/ml)</th>
<th>%GI(\text{mean} \pm \text{SE})</th>
<th>P.value (with control)</th>
<th>IC50 (µg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 (Control)</td>
<td>0.001±0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.8125</td>
<td>9.59±0.25</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>15.625</td>
<td>19.35±0.24</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>31.25</td>
<td>31.51±0.20</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>62.5</td>
<td>42.66±0.25</td>
<td>&lt;0.001</td>
<td>93.28</td>
</tr>
<tr>
<td>125</td>
<td>56.38±0.23</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>69.54±0.18</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>80.34±0.22</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>83.57±0.23</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

%GI: Growth inhibition percent, IC50: Concentration which inhibits the growth of 50% of the cells. S.E.: Standard error of mean
The data represented by (Table 2) revealed that the SW480 cells treated with serial concentrations of Methotrexate displayed a significant \((P<0.001)\) cellular GI\%, in response to MTX treatment, as compared with control cells, however, MTX maximum GI\% was \((59.63\pm0.33)\) at 1000µg/ml with IC50 value 323.55µg/ml.

**Table 2. Percent of SW480 cells growth inhibition for MTX.**

<table>
<thead>
<tr>
<th>Concentration (µg/ml)</th>
<th>%GI mean ± SE</th>
<th>P.value (with control)</th>
<th>IC50 (µg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00  (Control)</td>
<td>0.001±0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.8125</td>
<td>2.42±0.34</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>15.625</td>
<td>10.63±0.25</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>31.25</td>
<td>19.49±0.28</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>62.5</td>
<td>30.13±0.31</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>38.93±0.15</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>49.27±0.21</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>58.23±0.26</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>59.63±0.33</td>
<td>&lt;0.001</td>
<td>323.55</td>
</tr>
</tbody>
</table>

The SW480 cells were more sensitive to PAX2M than MTX, as PAX2M displayed a higher maximum inhibitory effect in SW480 cells growth than MTX at the 1000 µg/ml dose, and also at each serial utilized dose, PAX2M expressed the more GI\% than MTX, this may indicate a more potency character of PAX2M. (Figure1-A).

**Cytotoxicity assessment in VERO line.**

The results obtained indicated a significant \((P<0.001)\) inhibition of VERO cells’ growth which were treated with various concentrations of PAX2M ranged from 1000 to 7.8125 µg/ml in comparison to untreated control VERO cells. The percent of cell growth inhibition was ranged from \((9.59\pm0.17 - 54.48\pm0.18)\), with an IC50 value of 626.13µg/ml, the maximum growth inhibition percent \((54.48\pm0.18)\) was displayed with 1000µg/ml of PAX2M, (Table 3).

**Table 3. Percent of VERO cells growth inhibition for PAX2M.**

<table>
<thead>
<tr>
<th>Concentration (µg/ml)</th>
<th>%GI mean ± SE</th>
<th>P.value (with control)</th>
<th>IC50 (µg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00  (Control)</td>
<td>0.38±0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.8125</td>
<td>9.59±0.17</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>15.625</td>
<td>10.66±0.22</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>31.25</td>
<td>13.42±0.22</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>62.5</td>
<td>24.39±0.28</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>38.86±0.22</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>41.39±0.19</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>47.15±0.16</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>54.48±0.18</td>
<td>&lt;0.001</td>
<td>626.13</td>
</tr>
</tbody>
</table>
The data from the (Table 4) revealed that The VERO cells treated with different concentrations of Methotrexate ranged from 1000 to 7.8125 µg/ml, displayed a significant ($P<0.001$) cellular growth inhibition, in response to its various dose levels treatments, as compared with control VERO cells. MTX maximum GI% was $(60.72±0.26)$ at 1000µg/ml, it was higher than its respective value expressed by PAX2M at 1000 µg/ml. The IC50 value of MTX was 320.15µg/ml. The percent of VERO cells growth inhibition was ranged from $(13.53±0.28 - 60.72±0.26)$.

Table 4. Percent of VERO cells growth inhibition for MTX.

<table>
<thead>
<tr>
<th>Concentration (µg/ml)</th>
<th>%GI mean ± SE</th>
<th>P value (with control)</th>
<th>IC50 (µg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 (Control)</td>
<td>0.38±0.108</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>7.8125</td>
<td>13.53±0.28</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>15.625</td>
<td>20.54±0.19</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>31.25</td>
<td>31.44±0.35</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>62.5</td>
<td>32.67±0.24</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td>40.41±0.31</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>250</td>
<td>47.66±0.24</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>500</td>
<td>54.55±0.216</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>60.72±0.26</td>
<td>&lt;0.001</td>
<td>320.15</td>
</tr>
</tbody>
</table>

Figure 1. GI% of PAX2M and MTX (A) in SW480 , (B) in VERO cell line.

Overall IC50 outcomes

The comparison between the IC50 values of the tested compounds in both SW480 and VERO lines is shown in figure (2). PAX2M IC50 (93.28 µg/ml) was lower than methotrexate value (323.55 µg/ml), PAX2M had not markedly growth inhibitory effects in VERO cells when its IC50 value compared to the respective IC50 values in SW480 cancer cells, while methotrexate inhibitory effects were closely convergent in both SW480 cancer cells and VERO cells. Otherwise, PAX2M had not markedly growth inhibitory effects in VERO cells when their IC50 values compared to the respective IC50 values expressed by methotrexate.

**Discussion**

The present study aimed to evaluate the the effectivity of the C-MYC oncoprotein-blocking investigational agent PAX2M in the growth suppression of the colorectal cancer cells and assessment of its concomitant safety outcomes in the normal nonneoplastic cells, hence the results indicated that this tested compound can be utilized as a potent C-MYC oncoprotein inhibitor with considering the extraction of preclinical recommendations for the clinical trials. The exhibited cytotoxic action of PAX2M indicates, to some extent, its ability to direct targeting of the deregulated levels of C-MYC in cancer cells and blocking its abnormal overreactions and thereby its downstream target genes and upstream signaling aberrations with neoplastic potential. In general, these findings concurred with the outcomes achieved from the inhibition of other transcriptional factors families, especially the bHLH domain-containing transcriptional factors families, as C-MYC is a bHLH transcriptional factor. Xiong and his team concluded from their review that the transcription factors are usually deregulated in the pathogenesis of a wide range of human cancers and are a major class of cancer cell dependencies. Consequently, the transcription factors targeting can be powerfully effective in treating particular malignancies, also the emphatic diversity and potency of transcription factors as drivers of cell transformation justify an ongoing pursuit of them as therapeutic targets for drug discovery.  

PAX2M efficacy outcomes were assessed according to the exposure time of cancer cells recommended in this study, which was 24-26hour, and the prolongation of the exposure time may result in PAX2M potency improvement, and this presumption required further experiments to obtain the right conclusion about efficacy as well as normal cells toxicity parameters. Balaji and his team, in 2014, tested the anticancer effects of sinapic acid human colorectal cancer cell lines SW480 and HT-
29, they treat the cells with various concentrations of sinapic acid and calculated the IC50 values at different time points 24h, 48h, and 72h, and they found that the IC50 values were reached a minimum when the cells were treated with sinapic acid for a prolonged period (72h)\textsuperscript{14}.

The MTX results in this study may be attributed to the impact of the genetic features of the utilized cell line. Morales and his work team concluded that MTX induced cell growth inhibition and the chemoresistance capacity of the colorectal cancer cells are related to their genetic pathways and the karyotypic features variation among the CRC cell lines \textsuperscript{15}. Also, the antiproliferative effect of MTX may be dependent on the time of exposure rather than concentration as founded by Huysentruyt and his colleague’s study that showed that Cisplatin is more effective than MTX on (VM-M3) cultured cells and tumor cells implanted mice \textsuperscript{16}. On the other hand, the investigational agent PAX2M can contribute to the improvement of cancer treatment efficacy by combined them with the conventional cancer therapeutic modalities to create a powerful therapeutic approach. The strategies aimed at targeting C-MYC have emerged as an effective cancer treatment, the C-MYC based combination therapy can be carried out through different approaches such as the selection of agents that target MYC by different mechanisms or compounds that act on other genes in its pathway or other pathways in different cellular processes.\textsuperscript{17} Remarkably, the inhibition of proliferation of the normal VERO cells by PAX2M was very low as compared with its cellular growth inhibition in colorectal cancer SW480 cell line. Also, methotrexate display a higher growth inhibition in VERO cells than PAX2M, these findings may indicate that PAX2M display a modicum cytotoxicity to the normal cells as compared with cancer cells. The lower cytotoxic effects of PAX2M in VERO cells than in cancer SW480 cells was consistent with Prochownil and his colleagues estimation, that the MYC expression by the normal cells might not substantially necessitate the limitations in the use of the MYC-based therapies, because of most of the normal cells are quiescent with little short-lived MYC expression levels, thus they might not be exposed to the MYC inhibitors \textsuperscript{18}. The PAX2M' results of the cytotoxicity assay, in both colorectal cancer and normal cells, achieved by this study were in agreement with the results obtained by other researchers who worked on targeting C-MYC by various molecules, which act by diverse mechanisms and pathways on colorectal cancer cells and cells from other types of cancer that associated with C-MYC overexpression. For instance, OmoMYC (dominant-negative allele of MYC) can produce rapid tumor regression in mouse models with low toxic effects for normal tissues. Omomyc represses the activation of E-box promoter elements by Myc/Max and blocks cancer cell proliferation \textsuperscript{19}.

**Conclusion**

PAX2M has a premium antineoplastic effects associated with higher \textit{in vitro} safety profiles in comparison with methotrexate. PAX2M seemed to be more potent and more selective than methotrexate in concern of colorectal cancer treatment, but this conclusion required confirmations by further studies.

**Ethical Clearance**: All were approved by the ethical committee of the Kufa university

**Conflict of Interest**: None

**Funding**: Self-funded

**References**


The Main Challenges Facing the Iraq Banks

Shaymaa Dhafer Hashem
Institute of Genetic Engineering and Biotechnology for Post Graduate Studies, University of Baghdad, Ministry of Higher Education and Scientific Research, Iraq

Abstract

The banking system is generally the main sector financed by different economic and social processes, within the framework of the objectives and policies of the development plans and the various sectors of the economy. The management of this system revolves around a number of laws, decrees and instructions, comes in the forefront of the Central Bank act and the instructions and follow up of developments in the banking system and the requirements of modernization, development and continuity through the various circles and organs, where he draws the central bank. Monetary policy, which plays an important role as part of overall economic policy. The global banking sector has witnessed many developments over the last ten years. These developments are likely to increase in the coming years in light of globalization and the implementation of the Financial Services Liberalization Agreement. These developments will undoubtedly have a significant impact on the future of Arab banks. Of the challenges ahead. Faced with these challenges and despite the success and profits of the banking system in the past years, the Secretariat requires that we clarify the fact that the global environment in which Iraqi banks are operating has changed completely and in a way that has not been taken into account. This development will not stop but it is a continuous process under which the fierceness of competition and constantly diversifying their instruments, and increasing the movements of capital in search of profit and safety. The importance of this research comes from the economic and political data in Iraq that has imposed itself on adopting a series of transformative steps towards the adoption of market economy mechanisms and economic stability to lay the foundation for sustainable development in which the private sector plays a major role, To rebuild the economy and provide full freedom to move to and from Iraq.

Keywords: Iraq Banks, Challenges, Financial inclusion, Differentiated banking, Banking technology

Introduction

Iraqi banks have faced more than three decades, and so far, many security, economic and political problems that have been reflected in their growth and development brought about by international, regional and some internal factors (1). These problems have increased now because of the occupation of a faction advocating large areas of our country, where it seized a number of branches of government and private banks and smuggled foreign currency out of the country. These complex problems cannot be resolved easily before removing the reasons that led to the return of the banking system and the functioning of the role of finance and investment in a normal manner, similar to the banks of other countries (2). The banking system must mobilize all its energies and unite its directions in order to face the crisis more effectively and emerge quickly and with minimal losses. His first work is to attract the unemployed to the public and pour them into lucrative loans and projects that yield good returns that meet the wishes of depositors and borrowers alike. Also, we would like to point out that most of the national capital has left Iraq, looking for more secure investment opportunities, even less profitable (3).

Low Oil Prices Embarrass Banks

Iraqi banks, like the banks of oil-exporting countries, now face a shortage of cash. The decline in
deposits has caused the public to decline as well as the deposits of ministries and government departments. This turn caused a contraction in lending at banks. This contraction caused in turn the decline in annual profits and also caused the problems of some companies and individuals from repaying their loans as a result of interruption of disbursement on some projects that borrowed contractors and investors. Amounts to be implemented by banks. This problem was not considered and did not calculate the managers of risk management in banks, which requires taking effective precautionary measures to address their effects.

**Development Orientation**

In light of the difficult financial conditions, it became necessary for banks to join some of them to finance the major strategic projects related to the reconstruction of damaged infrastructure since the first Gulf War and the second and liberated areas of gangs, because this campaign requires a lot of money to restore life in the destroyed structures.Either collected from banks and pumped in the form of syndicated loans or it is best to collect these amounts and establish a development bank with the participation of the government to be a large capital, which encourages the World Bank and the Asian Investment Bank to participate with the funds and expertise needed by Iraq at the present time. Germany took advantage of this option and established the German Development Bank immediately after the Second World War, where the bank assumed responsibility for the reconstruction of buildings destroyed by the war in order to provide the funding needed by its economy and infrastructure. This bank is still working to this day and offers its continued experience and experience to countries that suffer the same conditions suffered by Germany. Here, visions and efforts must be united between the leadership of the monetary and financial policies to make the task a success because the efforts of any party alone does not help him to succeed.

**The Trend toward Financing Small and Medium Enterprises**

The cure of economic stagnation is through the support and financing of small and medium-sized enterprises because these projects contribute to the provision of goods and services necessary and provide the state importation in a difficult currency that the government suffers from the current scarcity and these projects according to international statistics accommodate more than 70% of the workforce in the country. The means of dealing with unemployment and poverty is the social message of banks in the whole world. It should be noted that banks are not the only ones to finance these projects, but rather initiated more than a government or social institutions funding, which necessitates the organization of these lending to be under the management of unified and coordinated and guaranteed success, otherwise, confusion will be bound to succeed and inevitably.

**Central Bank Intervenes**

On the initiative of a responsible by the Central Bank contributed to inject cash liquidity to stimulate the economy by 6 trillion dinars, or up to five billion dollars and these amounts allocated to basic projects in the Iraqi economy, namely sectors of agriculture and industry and construction and financing of small and medium enterprises and under prudent lending controls do not allow money to go for other purposes. Soft loans and simple and subsidized interest to meet the administrative costs of these loans. Term loans for a period of years which can be extended for the necessary cases. And distributed to all governorates according to the percentage of the population to ensure justice and grant funding opportunities and the employment of labor according to merit. It is expected that this initiative will achieve the desired results and reflected positively on the development of sectors of the economy and GDP.

**Government Banks**

These banks account for 90% of the banking volume in the country and represent deposits of approximately 85% and the remaining share of private banks. These banks have a network of branches extending from the middle of Baghdad, where the general administrations and main branches are exercised to the maximum of the four sides and border crossings. These banks suffer from the international sanctions imposed on the economy of the country by the United Nations following the invasion of Kuwait in 1990. These sanctions adversely affected the performance. These banks made them suffer from the non-use of modern mechanization and suffer from legal problems affecting their external activities. This is why the foreign transactions themselves were imposed on the Iraqi Trade Bank, which was established in 2003 to open the external appropriations for the state’s
imports instead of the bank Rafidain and Rasheed, and
the bank suffered mismanagement in an earlier period,
affecting its financial position as a result of the debt
has not recovered most of them so far. Number of
conclusions were reached can be summarized centrally
in the following points:

1. Over the last two decades, monetary policy has
been characterized by a negative attitude by restricting
the bank The Central Bank of Iraq as the last resort in
the financing process, which adopted the provision of
resources Financing, which took a major share of the
new cash issue due to the inability of sources Which led
to this expansion to flood the market with local liquidity
and in return The weakness of the productive apparatus,
which led to a rise in the general level of prices and
the reason for this The form of funding, which was
mostly financing inflation (11). The law of the Central
Bank of Iraq No. (64) for the year (1976) during the
long application period Relatively, did not guarantee
in essence the necessary independence of the bank to
achieve its objectives in monetary policy, Many of the
articles in the law specifically define the bank’s conduct
in its management of monetary policy In particular
with regard to providing the necessary support to the
Government in the implementation of its financial policy.

3. The reference to the possibility of using indirect
means in the management of monetary policy, has been
received in the laws that preceded 2004, but in fact their
use was limited, because. The requirements of activating
the mechanism of action of these means were not
available in the monetary and financial environment and
on Although Law No. (56) Of 2004 has given broader
dimensions in the application of these tools, but the
monetary and financial environment still lacks the
requirements to activate these means (12).

4. A shift in the role of the Central Bank of Iraq from
the specific role of the policy of private commercial
banks’ Lending and deposits and interest rates to an
observer role for lending movements, deposits and
prices Interest, as the Central Bank granted commercial
banks the freedom to determine interest rates on the
basis of The economic situation of the country to achieve
profits for these banks following the legislation of the
Banking Act.

5. Monetary policy in the use of indirect instruments
after 2003 was able to maintain On a good exchange
rate of the dinar against the US dollar through the
foreign exchange auction which Considered the central
exchange market leading to the exchange rates of the
Iraqi dinar, and used as an indicator To stabilize the
inflation expectations of the public by reducing the
speed of money circulation and increasing demand for
it And to enhance the attractiveness of retaining the
ethnic dinar(13).

6. In recent years, monetary policy has faced many
challenges, including dollarization, The constant rise in
prices and the impossible trinity problem, as well as the
absence of coordination between them and the general
economic policy of the state in addition to the link money
supply mainly and the financial status of the government
and its financial policy, especially the expenditure of the
two factors With which the central bank has significant
influence or effective control (14).

Conclusion

The Iraqi banks are performing their banking
services to their internal and external clients. They must
be strong in their country so that they can benefit from
the current banking situation where there are no limits
and no restrictions. This requires that the leaders of these
banks, especially the marketing of services and research,
have professional competence for the purpose of entering
to the needs of societies in terms of traditional banks
offer in accordance with the methods of complementary
participation in particular at the national level despite the
reforms introduced in this sector is still suffering from
the secretions and consequences of financial imbalance
because of the circumstances experienced by the country,
where banks are still as the future trends indicate that
there are real opportunities for the transformation of
national banks into an effective economic force within
the global economy, these opportunities must be used to
keep pace with the comprehensive transformations, and
this is being achieved in greater measure of structural
reforms at the financial and economic levels.

Ethical Clearance: People identified as potential
research participants because of their status as relatives
or carers of patient’s research participants by virtue of
their professional role in the university and departments.

Source of Funding: Self-Funding

Conflict of Interests: The authors declare there is
no conflict interests
References


Factors Affecting the Implementation of Clean and Healthy Living Behavior at Household Level (Observational Study at Sungai Paring Village, Martapura Kota District)

Laily Khairiyati1, Fauzie Rahman2, Arnila Udin3, Vina Yulia Anhar2

1Health Environment Department, Program Study of Public Health, 2Health Policy Administration and Health Promotion Department, Program Study of Public Health, 3College Student of Program Study of Public Health, Faculty of Medicine, Lambung Mangkurat University, South Kalimantan Province, Indonesia

Abstract

Clean and Healthy Living Behavior/Perilaku Hidup Bersih dan Sehat (PHBS) is a health behavior by individual, family, and community to help themselves improving health status. The aim of this study was to explain the factors that influence PHBS implementation at household level in Sungai Paring Village. This study was a quantitative by using cross-sectional approach. Population of this study were 2638 households. Technique sampling used purposive random sampling with sample of 91 households. The study was analyzed by chi-square test with CI 95% and significance level 0.05. The results showed that there were no relationship between knowledge (p-value = 0.103), attitude (p-value = 0.172), distance of health care facilities (p-value = 0.089) with the implementation of PHBS. Meanwhile, support from health workers (p-value = 0.001) and community leaders (p-value = 0.010) had relationship with the implementation of PHBS. Health workers, community and stakeholders should strengthen cooperation as an effort to improve the achievement of PHBS program implementation through routine monitoring and evaluation at household level.

Keywords: Clean and Healthy Living Behavior, PHBS program, household level, health, behavior, Sungai Paring Village

Introduction

Health degrees are not only determined by health services, but the more dominant ones are influenced by environmental conditions and people’s behavior1. Household members need to be empowered to implement clean and healthy living behavior or perilaku hidup bersih dan sehat (PHBS) to prevent from infectious or non-infectious diseases2.

Ramdaniati (2008) stated that there was an influence of knowledge and attitude toward the implementation of PHBS at household level3. Tumiwa, Rattu and Tucunan’s research (2014) states that the predisposing, enabling, and reinforcing of health behavior, attitude, facilities and infrastructure, such as support from health professionals had a great influence in encouraging members of the household to do PHBS at household level4. Budiman et al. (2012) said that knowledge, support and attitude of health workers could illustrate the implementation of PHBS at household level in Cimahi City5. Based on several studies, concluded that several factors such as level of education, knowledge, attitude, availability of facilities, infrastructure and support or attitude of health worker can influence the implementation of PHBS at household level.

The national target achievement of PHBS at household level based on the Ministry of Health’s strategic plan for 2015-2019 is 70%6. Based on data of Indonesian Health Profile in 2014, it was stated that the last achievement only reached 56.58%, it means that the achievement of PHBS at household level was still far from the predetermined target. South Kalimantan Province was one of the provinces that had achievement under the national target (49.74%)7. Banjar Regency had the achievement of PHBS at household level of 52.1% which also did not reached the National target8. Based
on data from the Public Health Development Index in 2007 and 2013, Banjar Regency was ranked 13. Based on the result of Basic Health Research (2013) indicating that Banjar Regency can affecting Public Health Development Index of South Kalimantan Province (ranked 31 from 33 provinces). It needs to be a concern because the PHBS achievement data on the household level in Banjar Regency was not reached the target of both provincial and national\(^9\).

Data from the Banjar District Health Office in 2014 stated that Martapura Kota District had the lowest percentage of household PHBS in Banjar Regency, which was 37.1\(^8\). Based on data from Martapura 1 Public Health Center, the lowest achievement of PHBS at household level was in Sungai Paring Village as much as 0.87\% of 1846 households that had been monitored\(^10\). Based on description above, this research was conducted to explain the factors that influence the implementation of PHBS at household level in Sungai Paring Village, Martapura Kota District.

**Methodology**

This research was an analytic observational study. A cross sectional approach was conducted among community of Sungai Paring Village, Martapura Kota District, South Kalimantan Province, Indonesia. Population of this research were 2638 households. Sampling technique used purposive random sampling with inclusion criteria for families who have children or toddlers as many as 91 respondents. Sample calculation used Stanley Lemeshow’s formula.

Knowledge, attitudes, distance of health care facilities, and support from health workers and community leaders as independent variables. Dependent variable was PHBS implementation at household level. Informed consent sheet was filled in as a form of agreement to be a respondent. The collected data was analyzed by using SPSS software. Analysis was conducted to explain the relationship between independent and dependent variables by using chi-square test with CI 95\% and significance level 0.05.

**Results**

There were the results of univariate (Table 1) and bivariate analysis (Table 2) between knowledge, attitude, distance of health care facilities, support from health workers and community leaders with PHBS implementation at Sungai Paring Village among 91 respondents.

**Table 1: Distribution and frequency of knowledge, attitude, distance of health care facilities, support from health & community leaders and PHBS implementation**

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less</td>
<td>47</td>
<td>51.6</td>
</tr>
<tr>
<td>Good</td>
<td>44</td>
<td>48.4</td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>30</td>
<td>33.0</td>
</tr>
<tr>
<td>Positive</td>
<td>61</td>
<td>67.0</td>
</tr>
<tr>
<td>Distance of health care facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far from house</td>
<td>73</td>
<td>80.2</td>
</tr>
<tr>
<td>Near from house</td>
<td>18</td>
<td>19.8</td>
</tr>
<tr>
<td>Support from health workers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less support</td>
<td>77</td>
<td>84.6</td>
</tr>
<tr>
<td>Support</td>
<td>14</td>
<td>15.4</td>
</tr>
<tr>
<td>Support from community leaders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less support</td>
<td>74</td>
<td>81.3</td>
</tr>
<tr>
<td>Support</td>
<td>17</td>
<td>18.7</td>
</tr>
<tr>
<td>PHBS implementation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Didn’t do PHBS</td>
<td>85</td>
<td>96.7</td>
</tr>
<tr>
<td>Did PHBS</td>
<td>6</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Note: \(n = \) frequency; \(\% = \) percentage of frequency

**Table 2: Relationships between knowledge, attitude, distance of health care facilities, support from health workers and community leaders with PHBS implementation**
Variables | Categories | Didn’t do PHBS | Did PHBS | Total (%) | p-value
--- | --- | --- | --- | --- | ---
Knowledge | Less | 46 | 50,5 | 1 | 1,1 | 47 (51,6) | 0,103 |
| Good | 39 | 42,9 | 5 | 5,5 | 44 (48,4) |
Attitude | Negative | 30 | 33,0 | 0 | 0 | 30 (33,0) | 0,172 |
| Positive | 55 | 60,4 | 6 | 6,6 | 61 (67,0) |
Distance of health care facilities | Far from house | 70 | 76,9 | 3 | 3,3 | 73 (80,2) | 0,089 |
| Near from house | 15 | 16,5 | 3 | 3,3 | 18 (19,8) |
Support from health workers | Less support | 77 | 84,6 | 0 | 0 | 77 (84,6) | 0,001* |
| Support | 8 | 8,8 | 6 | 6,6 | 14 (15,4) |
Support from community leaders | Less support | 72 | 79,1 | 2 | 2,2 | 74 (81,3) | 0,010* |
| Support | 13 | 14,3 | 4 | 4,4 | 17 (18,7) |

Note: n = frequency; Statistical test applied: chi-square test; *significant values (<0.05)

Based on table 1 showed that majority of respondents had less knowledge as many as 47 people (51,6%). Respondents had positive attitude as many as 61 people (67,0%). There was 73 respondents (80,2%) stated that their house is far from health care facilities. Majority of respondents stated that health workers gave less support to them to do PHBS as many as 77 people (84,6%). Community leaders were also gave less support them to do PHBS as many as 74 respondents (81,3%). Majority of respondents didn’t do PHBS at household as many as 85 people (96,7%).

Based on table 2 showed that there were no influence of knowledge (p-value = 0,103), attitude (p-value = 0,172), distance of health facilities (p-value = 0,089) with PHBS implementation at household level. Support of health workers (p-value = 0,001) and community leaders (p-value = 0,010) were related to PHBS implementation at household level.

Discussion

There is several factors that affecting PHBS practice at household level. In the results of Hasni, Nurdin and Edward’s research, respondents who have high knowledge and have the willingness to do PHBS, tend to practice PHBS\textsuperscript{11}. That results was different with our research. Based on the result showed that knowledge did not have relationship with PHBS practice. This result was similiar with the research of Hapsari (2010) which states that knowledge did not have a significant influence on the practice of clean and healthy living behavior\textsuperscript{12}. This research was found that respondent with less knowledge still did PHBS. To behave healthily, the community sometimes not only needs knowledge and positive attitude, or support from facilities only, but it also needs the role model from family or peers\textsuperscript{13}. The low level of knowledge in the results of the study might caused by the fact of many people who claim they have never received counseling from health workers around their homes.
Attitude did not have relationship with PHBS implementation at household level. This result was in line with the research of Haniek (2010) that stated an attitudes do not have a significant influence on the practice of clean and healthy living behavior (p-value = 0.087). The result of this study was not in line with Mahfudah’s research (2013), said that attitudes can influence individuals in a clean and healthy lifestyle. An attitude has not been automatically realized in an action (overt behavior). The realization of an attitude to be a real action requires a supporting factor or a possible condition. The majority of respondents had positive attitude, but did not implement PHBS can be affected by characteristics of the person such as emotional level. People with high emotional and motivated to behave according to attitudes that have existed within their individually, will strive best for the behavior of clean and healthy living.

Distance of health care facilities was not influencing the implementation of PHBS at household level. This result was in line with the research of Hapsari (2010) which states that distance did not have a significant influence on the practice of clean and healthy behavior. However, in contrast to the results of Ningsih’s research (2014) which states that the distance of health care facilities had an influence on the implementation of PHBS at household level. Ningsih’s research (2014) showed that respondents who had a long distance from the place of health service allowed respondents to not implement PHBS at household level. There are certain distance limitations so that people still want to seek health services. Distance limits are significantly influenced by the type of road, type of vehicle, and transportation cost. Road facilities are still adequate and allow people to seek health care facilities even though the distance from the community’s residence is categorized far.

Support from health workers had influence on implementing PHBS at household level. This result was in line with Hapsari’s research (2010) which states that health worker’s support had a significant influence on the practice of clean and healthy living behavior. The support can be in the form of counseling or monitoring conducted by health workers in order to create healthy behavior in the community. Support from community leaders had influence on implementing PHBS at household level. This result was in line with Pratama’s research (2009) which states that the support of community leaders had a significant influence on clean and healthy living behavior, where the higher the role of community leaders in healthy behavior, the higher the motivation of the community to implement PHBS. Community leaders playing a role in the implementation of PHBS such as mobilizing the potential resources to develop healthy behaviors in the community, collaborating to create a healthy environment, and creating the conducive atmosphere to support changes in healthy behavior.

**Limitation**

This study was conducted among household in Sungai Paring Village and might therefore not being representative of other village in Martapura Kota District, Indonesia.

**Conclusions**

It can be concluded from this study that knowledge, attitude and distance of health facilities were not influencing someone to aplicate PHBS at household level. Several factors that influencing PHBS practice at household level were support from health workers and public figures, such as community leader. Community leaders can help activate PHBS programs such as increasing exclusive breastfeeding achievements and making healthy latrines, in several ways such as the formation of exclusive breastfeeding groups, or by forming healthy latrines.

Health workers should work together with community leaders as an effort to improve the achievement of PHBS at household level in Sungai Paring Village community. These efforts can be carried out by health workers socializing to community leaders regarding PHBS practices, so that community leaders can invite the community to implement PHBS at household level. Health workers and community leaders collaborating in order to monitor PHBS implementation at household level.

**Ethical Clearance:** The study was approved and received ethical clearance from the Research Ethics Committee of Public Health Study Program, Faculty of Medicine, Lambung Mangkurat University, Indonesia. We followed the guidelines of the Committee on Public
Health Committee on Research Ethics, Faculty of Medicine, Lambung Mangkurat University, Indonesia for ethical permission and informed consent for this study.

**Sources of Funding:** This research was conducted with self funding from Public Health Study Program, Faculty of Medicine, Lambung Mangkurat University, Indonesia.

**Acknowledgement:** We would like to thank all the respondents, the community of Sungai Paring Village, who were helpful in carrying out this research. Gratefully acknowledge also to Public Health Program Study, Faculty of Medicine, Lambung Mangkurat University and government of Banjar District for giving permission to carry out this research.

**Conflict of Interest:** The authors reported no conflict of interest.

**References**


15. Mahfudhah D. Relationship of knowledge, attitudes, and work of mothers to clean and healthy living behavior in the household order in Reukih Dayah Village, Indrapuri District, Aceh Besar District. E-journal of University of U’budiayah Indonesia 2013.


17. Ningsih FG, Jonyanis. Clean and healthy behavior in


Point Prevalence of Healthcare Associated Infection and its Risk Factors among Patients Admitted to the Intensive Care Unit in Baghdad Medical City

Waleed Ibraheem Ali¹, Hayder Adnan Fawzi², Huda Jassim Lafta³, Sarah Alaa Mohammed³, Noor Mosaad Ameer³
¹Internal Medicine & Intensive Care, Lecturer Internist, College of Medicine, Baghdad University, ²Baghdad Medical City, Baghdad Teaching Hospital, Clinical Pharmacy Department, Baghdad, Iraq, ³Medical Student’s Graduate, a Collage of Medicine, Baghdad University

Abstract

Objective: assess the prevalence, risk factors, microbiological profile of hospital-acquired infections (HAI), and HAI impact on ICU stay and mortality in the Intensive Care Unit.

Materials and Method: a cross-sectional study conducted on 83 patients in ICU of Ghazi Al Hariri hospital at the Baghdad Medical City, the study started from 1st July to 30th September 2018. All the patients were followed throughout their hospital stay, the septic screen was done for all patients. The specimens were processed by standard microbiological methods to isolate and identify bacteria etiology.

Results: The overall prevalence was 67.5%, the most common type of HAI was ventilator-associated pneumonia (VAP), followed by catheter-associated urinary tract infection (UTI), bloodstream infections (BSI) and surgical site infections (SSI). Pseudomonas, Candida and Klebsiella were the most common agents causing these infections with a different rate of presentation. Prolonged hospital stay, urinary catheterization and the use of H2 antagonist had higher odds of acquiring HAI (P<0.05).

Conclusion: High prevalence of hospital-acquired infection with VAP and UTI as the most common types, Klebsiella was the most common etiological agent for VAP, Candida was the most common cause of UTI and SSI. Longer hospital stay and the use of H2 antagonist associated with increased risk of HAI.

Keywords: H2 antagonist, Klebsiella, pneumonia, VAP, hospital stay, ventilator.

Introduction

Nosocomial Infections are infections acquired during hospital care, which were not present, or incubating at the time of admission. Infections occurring more than 48 h after admission were considered nosocomial infections or HAIs. HAI is increasingly becoming an important public health problem affect the quality of health care and a major source of adverse outcomes during health care delivery. It contributes to increased morbidity and mortality, excess health care costs and prolongs hospital stay. It has a far-reaching consequence to the public resulting in widespread occurrence of multidrug-resistant bacteria in hospital settings.

The burden of HAI in developing countries is significant whereby the incidence can be up to 15% of total hospitalized patients, and up to 50% among ICU patients, in developed countries the magnitude of the problem in the low-income settings remains largely unknown and in most cases underestimated due to the complex nature of its diagnosis and lack of proper surveillance. According to multiple sources, between 20% and 50% of healthcare-associated infections (HAIs) occur in the intensive care unit (ICU). In 2007, 39% of patients in European countries were affected.

DOI Number: 10.5958/0976-5506.2019.00752.6
by these infections. These infections presented in the most dangerous and sometimes life-threatening forms of infection, such as pneumonia, bloodstream infection, wound infections and urinary tract infection; therefore, surveillance of these types of infections is important in the ICU.

The development of HAIs can be facilitated by the ICU environment, medical procedures applied to treat the patient and, above all, the patient’s general health. Intensive care units treat severely ill patients whose underlying disease and co-existing diseases may contribute to the development of healthcare-associated infections. The need to perform many diagnostic and treatment activities on patients results in the use and long-term maintenance of invasive devices, such as central vascular lines (CVC), intubation tubes, and urethral catheters (which may result in the removal of the natural protective barrier against infections), so factors such as the increased use of invasive devices, immunosuppressive drugs, and immunocompromised status as well as irrational use of antibiotic therapy in ICUs are all contributions for this cause.

Among healthcare-associated infections, PN is the most common and accounts for between 30% and 50% of all infections. Epidemiological studies indicate that bloodstream infections are low frequently found and their prevalence ranges from 4% to 20% Among HAIs, the prevalence of urinary tract infections ranges from 3% to 7%

The most frequent microorganism in Intensive Care Unit of Ghazi al-Hariri Hospital is Klebsiella pneumoniae which account (30%) of total microorganisms followed by Pseudomonas aeruginosa (24%), Acinetobacter baumannii (16%), coagulase (-) Staphylococcus (12%), Burkholderia cepacia (4%), coagulase (-) Staphylococcus (4%), and Proteus mirabilis (4%). The aim of this study was to determine the prevalence of healthcare-associated infections in the intensive care unit of Ghazi al Hariri and the comments types of these infections, the microbiological profile of HAIs and the associated risk factors, and to assess the impact of these infections on ICU stay and mortality.

Method

Setting

The study was conducted at Intensive Care Unit of Ghazi Al Hariri hospital in Baghdad medical city.

Study design

A hospital-based cross-sectional study conducted from 1st July to 30th September 2018, all patients admitted to ICU, with no evidence of bacterial infections at admission were included in the study.

Data collection

Socio-demographic and clinical data were collected by the structured form which includes (age, gender, date of administration, diagnosis, culture results, types of microorganisms, the use of invasive devices, and finally the fate of patients). The patients were followed first for 8 hours, patients who have developed any form of infection within 48 h of admission and/or had asymptomatic bacteriuria were excluded. All the rest of the patients were followed for the occurrence of HAI until discharge, progress or death by the researchers. The Occurrence of HAI was confirmed by reviewing the laboratory biological results for all the participants.

Definition

The primary outcome variable was the occurrence of infection after 48 h of hospitalization in a patient otherwise not having an asymptomatic or incubating infection on hospital admission. The following are definitions used in this study for a specific type of HAI (Adopted from Centre for disease control/National Health care Safety Network (CDC/NHSN) surveillance definition for healthcare-associated infection with slight modification):

Bloodstream infection: Patient with any of the following signs and symptoms: fever (>38 °C), Chills/rigors or hypotension and at least one positive blood culture not related to contamination.

Healthcare-associated pneumonia: Respiratory symptoms with at least two of the following signs and symptoms appearing during hospitalization; a cough, purulent sputum, new infiltrate on chest radiograph consistent with infection.

Surgical site infection: any purulent discharge, abscess, or spreading cellulitis at the surgical site during the month after the operation.

Urinary tract infection: mid-stream urine cultures with ≥105 colony forming units (CFU) and catheter
urine with $\geq 10^2$ CFU/ml with no more than 2 species of microorganisms isolated OR positive dipstick for leukocyte esterase OR pyuria ($\geq 10^6$ white blood cells / high power field) of clean catch urine in a patients with or without signs and symptoms in the presence or absence of recent urinary catheterization.

Statistical analysis

Statistical Package for the Social Sciences (SPSS STATISTICS 24, Armonk, NY, USA) and Microsoft Excel (Microsoft Office 2016, Redmond, WA, USA) was used in the statistical analysis of the collected material. The significance level was $p < 0.05$. In addition, the pooled mean, median (Me), standard deviation (SD), Chi-squared (Pearson) $\chi^2$ for the ordinal and nominal scales and an ANOVA for the quantitative scale were calculated.

Results

The most common type HAI was VAP while UTI was slightly lower, see figure 1.

![Figure 1: types of HAIs](image)

Candida was the most common cause of UTI and SSI, while Pseudomonas aeruginosa is the commonest cause of bacteremia, as illustrated in table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTI microorganisms</td>
<td></td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>3 (6.0%)</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>8 (16.0%)</td>
</tr>
<tr>
<td>Candida</td>
<td>19 (38.0%)</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>9 (18.0%)</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>4 (8.0%)</td>
</tr>
<tr>
<td>Number of infectious bacteria, n (%)</td>
<td></td>
</tr>
<tr>
<td>No infection</td>
<td>22 (44.0%)</td>
</tr>
<tr>
<td>Single</td>
<td>15 (30.0%)</td>
</tr>
<tr>
<td>Multiple</td>
<td>13 (26.0%)</td>
</tr>
<tr>
<td>Candida</td>
<td>2 (4.0%)</td>
</tr>
<tr>
<td>Acinetobacter</td>
<td>1 (2.0%)</td>
</tr>
<tr>
<td>Bacteremia, n (%)</td>
<td>14 (28.0%)</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>2 (4.0%)</td>
</tr>
<tr>
<td>Staphylococcus</td>
<td>1 (2.0%)</td>
</tr>
<tr>
<td>Candida</td>
<td>1 (2.0%)</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>4 (8.0%)</td>
</tr>
<tr>
<td>Enterobacter</td>
<td>1 (2.0%)</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>1 (2.0%)</td>
</tr>
<tr>
<td>Actinobacteria</td>
<td>3 (6.0%)</td>
</tr>
<tr>
<td>E. Coli</td>
<td>3 (6.0%)</td>
</tr>
<tr>
<td>Number of infectious bacteria, n (%)</td>
<td></td>
</tr>
<tr>
<td>No infection</td>
<td>36 (72.0%)</td>
</tr>
<tr>
<td>Single</td>
<td>12 (24.0%)</td>
</tr>
<tr>
<td>Multiple</td>
<td>2 (4.0%)</td>
</tr>
</tbody>
</table>

UTI: urinary tract infection, SSI: surgical site infection, n: number,

The use of H2 antagonist was associated, and longer duration of hospital stay associated with increased risk of infection, as illustrated in table 2.
Table 2: Assessment of demographic and clinical data according to HAI

<table>
<thead>
<tr>
<th>Variables</th>
<th>No infection</th>
<th>Infection</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>24</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>Age (years), mean ±SD</td>
<td>39.8 ± 23.7</td>
<td>39.3 ± 24.3</td>
<td>0.923</td>
</tr>
<tr>
<td>Gender, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>10 (41.7%)</td>
<td>19 (38%)</td>
<td>0.762</td>
</tr>
<tr>
<td>Male</td>
<td>14 (58.3%)</td>
<td>31 (62%)</td>
<td></td>
</tr>
<tr>
<td>H2 antagonist use, n (%)</td>
<td>11 (45.8%)</td>
<td>41 (82.0%)</td>
<td>0.001 [S]</td>
</tr>
<tr>
<td>Duration of stay (days), mean ±SD</td>
<td>6.0 ± 4.2</td>
<td>25.3 ± 23.5</td>
<td>&lt;0.001 [S]</td>
</tr>
<tr>
<td>Medical devices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilator use, n (%)</td>
<td>13 (54.2%)</td>
<td>26 (52.0%)</td>
<td>0.861</td>
</tr>
<tr>
<td>CVL, n (%)</td>
<td>14 (58.3%)</td>
<td>31 (62.0%)</td>
<td>0.762</td>
</tr>
<tr>
<td>Fate, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survived</td>
<td>12 (50.0%)</td>
<td>24 (48.0%)</td>
<td>0.872</td>
</tr>
<tr>
<td>Death</td>
<td>12 (50.0%)</td>
<td>26 (52.0%)</td>
<td></td>
</tr>
</tbody>
</table>

SD: standard deviation, n: number, CVL: Central Venous line

**Discussion**

The total prevalence of healthcare-associated infections in ICU of Ghazi Al Hariri hospital was 67.5%, it is very high prevalence compared to the other countries such as in Switzerland(26.2%)\(^{13}\), India(20%)\(^{14}\), Poland(39%)\(^{15}\), and Philippine(28%)\(^{16}\).

The commonest form of HAIs in the study was pneumonia with 58% prevalence followed by UTI 56%, BSI (28%) and SSI (6%). In other countries such as Europe, pneumonia prevalence was 5.5%, BSI (3.5%) UTI (2.6). In Rome the most common infection was pneumonia (35%), SSI (22.2%), UTI (19.4%), BSI (17.2%)\(^{17, 18}\). The high prevalence could be explained according to the different nature of patients, high rate of using the ventilator, the regularity of changing the ventilator, using of acid-suppressive medications and prior antibiotic exposure.

In the current study the prevalence of VAP point prevalence was 39%, Which was higher than other studies like Deppe et al.

The most frequent microorganism of VAP Pseudomonas Aeruginosa (24%) followed by Acinetobacter baumannii (22%), Klebsiella (18%), Candida albicans (16%), Proteus mirabilis (4%) and Haemophilus influenzae (2%). In a study done in Beirut, the most common organism was Acinetobacter anitratus, followed by Pseudomonas aeruginosa and Klebsiella species\(^{21}\). In another study done in Pakistan, 18% were diagnosed as VAP, the most frequent organisms Pseudomonas aeruginosa (26%), Staphylococcus aureus (20%), Acinetobacter spp. (9%)\(^{22}\). That shows us there isn’t a significant association between these organisms and mortality except Pseudomonas aeruginosa which has a significant association with mortality.

The second most HAI in the ICU is UTI, the prevalence was 38% which is much higher than the prevalence in other studies (19.4%) in Rome and Saudi Arabia (28.4%)\(^{17, 23}\). This higher prevalence of UTI...
could be attributed to the nature of the patient, a high rate of using the urethral catheter, and the type and the frequency of changing the catheter.

The present study revealed that using H2 antagonist increase risk of HAI especially pneumonia there are many theories about the causes, one of them attributed it to its effect on stomach acidity which allow growth of any organisms, they may promote pneumonia by suppressing coughing\textsuperscript{24}.

**Conclusion**

High prevalence of hospital-acquired infection with VAP and UTI as the most common types,\textsuperscript{1} Klebsiella was the most common etiological agent for VAP, Candida was the most common cause of UTI and SSI. Longer hospital stay and the use of H2 antagonist associated with increased risk of HAI.

**Conflict of Interest**: None

**Ethical Clearance**: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by college of medicine, Baghdad University.

**Source of Funding**: The workers was supported by authors only

**Acknowledgment**: The author thank the medical staff at Baghdad Medical city, and college of Medicine/University of Baghdad for their help completing this work

**References**


Histopathological Study of Well Differentiated Papillary Thyroid Carcinoma Case Study

Abdul Hadi Sallal Mohammed¹, Rasha Abdul Ameer Jawad² Ali Khudheyer Obayes¹

¹Dept. Medical Laboratory, College of Medical and Health Technique, University of Kufa, Najaf, Iraq, ²Dept. of Biology, College of Education for Pure Sciences, University of Kerbala, Iraq

Abstract

The present study conducted on a fifty year old women affected with well differentiated papillary carcinoma, the histological changes of the thyroid left lobe was revealed, irregular shapes of thyroid follicles and degenerative alteration in the most follicles, Some thyroid follicles were enlarged and fill with colloid which contain on the large vacuoles, From another hand metaplastic changes was occur in the thyroid tissue of old women patient, So the epithelial linings of some thyroid follicles was projected as papillae which extended into the lumen of follicles, as well as the multilocal tumors of thyroid tissue was encapsulated by thick fibrous connective tissue, dilation and congestion of thyroid arteries and veins in parenchyma of thyroid left lobe.

Keywords: Old women patient, Papillary Thyroid, Carcinoma, Histopathological.

Introduction

Thyroid Carcinoma, in the American United States. Comprises about (1%) of all Cancer and accounts for (0.2 %) of cancer health¹. Papillary carcinoma can occur at any age and rarely has been diagnosised as a Congenital tumour, most tumour are diagnosed in patients in third to fifth decades of life women are affected more frequently than men in ratio of thyroid (1:2) to (4:1)². The criteria for the recognition of thyroid follicular and thyroid papillary carcinoma have changes in recent years but both denominations have been retained, Papillae no longer seen to be necessary for diagnosis of papillary Carcinoma , cytologic features such as oncocyte , Clear cell, Squamous and mucinous changes have resulted in the designation of special tumour types and subtypes, the practical importance of these special types resides in differential diagnosis rather than their biological behavior³. The histogenesis of anaplastic thyroid carcinoma has been controversial , Some author have indicated that many of these tumors represented thyroid sarcomas, Whereas others have demonstrated that they are carcinomas, Currently , most pathologists agree that anaplastic thyroid carcinomas arise from follicular epithelial cells⁴. The thyroid carcinomas less than one centimeter are almost exclusively papillary and termed papillary thyroid micro carcinoma (PTMC) according to the World Health Organization⁵. Papillary thyroid carcinoma (PTC) is the most commonly observed well differentiated thyroid cancer in the endocrine clinics , most papillary thyroid cancer patients have a good prognosis and long – term survival without distant metastasis Tumour Node Metastasis (TNM) staging is most commonly used for the initial evaluation of thyroid cancer before and after thyroid surgery⁶. Inconsistent data concerning variant of papillary thyroid carcinoma may have been generated by inconsistent diagnostic criteria and differences in characteristics , such as the gender , age, and geographic location and ethnic background of the subjects enrolled in analysis , the reported histological variant of the papillary thyroid cancer in the children and adolescents differ from these in adult⁷. The purpose of present study was to evaluate the histological changes in the case report in women patient infected with papillary thyroid cancer.

Corresponding author:
Abdul Hadi Sallal Mohammed
Email: AL_hadi2002@yahoo.com
Material and Method

Fifty old female patient visited the Al-Sadar teaching hospital Naja. A retrospective examination of the record of patient with papillary Thyroid Carcinoma (PTC). The patient underwent with left thyroid lobectomy with isthmus removal. Gross examination was carried out the histo–pathological examination and staining of the cancer were conducted by the teams in the department of the histopathological in the hospital. Cancer was staged on the basis 8.

For histopathological examination, the thyroid gland (left lobe and isthmus) were obtained from patient and dissected and processed for light microscope examination the thyroid gland pieces were fixed in formalin solution for period (48) hours. The histological specimens were dehydrated in serial graduated ethyl alcohol concentration (70%, 80%, 90%, 100%), the period for each alcohol concentration (1.5) hour, the histological specimens were cleared in xylen for time (0.5 – 1) hour.

After that the histological specimens of thyroid gland were embedded in paraffin wax. The histological sections were done by rotary microtome; paraffin sections were cut at thickness (six) micrometer. Then the histological sections were stained with Haematoxylin and Eosin 9.

Results and Discussion

A fifty year old women presented with swelling in the neck region, swelling had gradually increased in size and was concerned breathlessness. Clinical examination appeared, 2.5 ± 3.5 centimeter hard non–tender mass. The patient was sent to surgery department to perform the left thyroid lobectomy and isthmus removal for histopathology. Gross examination showed left thyroid nodule: with grey–whitish mass (0.95±1) centimeter. Cut sections was revealed small ill defined area (0.35±0.45) centimeters. Several pieces were taken and four paraffin blocks were carried out. The histopathological diagnosis were observed: infiltrating sheets and clusters of differentiation papillary thyroid carcinoma, with evidence of marked parenchymal infiltration, the isthmus of thyroid gland sections were markedly included by cancer, the figures were consisting with well differentiated primary papillary thyroid carcinoma. These findings were similar to current study 10,11, they recorded, the fibrous capsule surrounding the tumour tend to be thicker and more irregular than in the thyroid adenomas, and capsular or vascular invasion only on microscopic evaluation, and extensive areas of invasion to adjacent thyroid tissue and widespread blood vessels infiltration.

The histopathological observation was appeared in the left lobe of thyroid gland in the fifty old women patient; the irregular arrangement of the thyroid follicles, and degenerative changes in some thyroid follicles, from another hand, some thyroid follicles were revealed enlargement and full with colloid contain large vacuoles which located on the edges of colloid in the serial manner. (figure 1), these results were accordance with previous studies 12,13 they mentioned; the traditional classification of thyroid cancer as well differentiated carcinoma (papillary and follicles; the cytologic features such as oncocytic, clear cell, squamous and mucinous changes have resulted.

(Figure2) showed, the histopathological changes, such as metaplastic changes, in the thyroid tissue, and protrusion of epithelial lining of some thyroid follicles as papillae which extended toward the lumen of the follicle, and the main findings of our study was the reduction of the thyroid follicles diameter and this reduction of the follicular diameter is concerned with depletion of colloid inside the thyroid follicles, these our observations were agreement with previous studies 14,3, reported the recognition of the papillary carcinoma criteria; the papillae of thyroid follicles no longer seem to be necessary for diagnosis of papillary carcinoma. Our histological section was showed. The thickening due to encapsulated the thyroid tissue tumour foci by fibrous connective tissue, the capsule sent the fibrous trabiculae among the parenchyma of the thyroid left lobe in fifty old women patient, from another hand, congestion in the thyroid arteries and vein which occur in the thyroid capsule and interstitial connective tissues, and large vacuoles where arranged at the edge of colloid in some thyroid follicles, as well as, adipose connective tissue was distributed in some areas of thyroid parenchyma may be led to adipolinoma (figure 3), these our finding were indicated with surrounded by a fibrous capsule which may by intact or focally infiltrated by the tumour, and some lesions have shown lymph node involvement.
Conflict of Interest: This research is a personal non-profit work and there is no conflict of interest.

Source of Funding: None.

Ethical Clearance: Ethical clearance was obtained from the Faculty Scientific Committee (Dept. Medical laboratory, College of Medical and Health Technique, University of Kufa, Najaf, Iraq) to Study the histopathological study of well differentiated papillary thyroid carcinoma.

References


5. Hedinger, C.; Williams, E. and Sobin, L. Histological typing of thyroid tumour. International histological classification of


Family Support of Ifontoks to their Pregnant Teenagers: an Extension Health Service Program of Mountain Province State Polytechnic College

June II A. Kiblasan

Dean of Nursing, Mountain Province State Polytechnic College, Bontoc, Mountain Province, Philippines

Abstract

Teenage pregnancy in the Philippines is increasingly turning out to be a major cause of concern. The rising trend among young women who are becoming mothers and majority of them are unmarried lead them vulnerable to death, susceptible to depression, abortion and others, especially if support from family is minimal.

This study focused on how social and spiritual health service program was developed and extended to pregnant teenagers. A reliable self-made data gathering tool was used to collect data from parent/s and the pregnant teenagers. Positive effects were observed and verbalized after launchings the first implementation of the health service program within the locality. Indeed, the nursing department of MPSPC included the service in the care of pregnant mothers during community immersion as part of the related learning experience (RLE) of the nursing curriculum.

Keywords: Pregnant teenagers, family support, Ifontoks, Social wellness, spiritual wellness

Introduction

The most crucial period in a person’s life is considered to be during teenager for this is the period of establishing one’s identity. They experiences changes whether in physical, emotional, social and spiritual aspects of life. In some cases, pregnancy may exist that might stunned the family. Family’s reactions may be denial or unacceptable while others might find it as a blessing, or as a punishment. Dealing alone with role changes, fears and adjustments of pregnancy happens and seeking support from family and friend is expected. Hence, if the pregnant woman plans to relinquish her infant, she still needs to deal with the adjustments of pregnancy.

Teenage pregnancy is the condition of a woman to have a baby during adolescence (13 to 19 years old). Ajala described that teenage pregnancy is a social construct, which represents one of the many indices of adolescent delinquency, sexual permissiveness and moral decay. It is a major concern because not only physical changes that may occur but also in the psychological and social aspects of their lives. Whereas, teenage pregnancy is regarded a major socio-medical phenomenon in both developed and developing countries and has become more rampant in recent times. Further, teenage mothering interrupts the natural course of teenage development most especially if occurred in the earlier age of adolescence due to numerous unexpected responsibilities. With these, holistic support in the perinatal period is a necessity for the traditional focus is on the maternal and child’s physical health. Neglect or insensitiveness to psychological and social wellness has great impact to wellness especially if pregnancy exists during adolescence and out of wedlock. Teenage pregnancy if out of wedlock may have undesirable effects to the health of the mother and child which is considered a worldwide public health concern. The Centers for Disease Control and Prevention reported a total of 249,078 babies were born to women aged 15 to 19 years with a birth rate of 24.2 per 1,000 women. Moreover, the average teenage birth rate in middle-income countries is two times higher than in a high-income countries while five times as high in low-income countries.

The United Nation Population Fund revealed Philippines is the only country in Asia Pacific region
that has cases of teen pregnancies rose over the last two decades. Accordingly, the Cordillera Administrative Region (CAR) tops the most teen pregnancies in the country at 18.4%.

Further, teenage pregnancy in Mountain Province is alarmingly increasing. Recent data from the Mountain Province Provincial Health Office revealed that there were 148 pregnant teenagers aging below 19 years old recorded for the first quarter of 2014. The municipality of Paracelis has the highest number of teenage pregnancy recording 39 individuals. While the capital town of Bontoc listed 34 pregnant young people, Bauko recorded 17, Tadian has 16, Natonin recorded 14, Besao has seven, Sabangan and Sagada both recorded five, Sadanga has two and Barlig has one teenage pregnancy.

For the third quarter of 2014, the first three municipalities/towns with highest incidence of teenage pregnancies were Paracelis listed 90, Bauko reported 52, and Bontoc has 47 cases of teenage pregnancies.

From the data, it was observed that program related to teenage pregnancy by concerned government and non-government agencies focused only on how to prevent its occurrence. No identified programs noted to support a teenager once they become pregnant. The Department of Health (DOH) focuses mainly on physical wellness of the mother and child during prenatal consultation. There may be programs related to other health needs of pregnant teenagers but not a known one and is a rare case. One thing, none was observed in the locality. These made the realization of this study to suffice whatever deficient support that can promote wellness.

Method

This paper utilized the Community Organizing Participatory Action Research (COPAR) design. This method is a continuous and sustained process of educating, organizing, and mobilizing people through community participation, action, and research. This is a vital part of public health nursing that aims to transform the apathetic, individualistic and voiceless poor into dynamic, participatory and politically responsive community.

The phases involved in this study are assessment, planning and implementation. In the assessment phase, community immersion was done at places within the barangays of Bontoc, Mountain Province where cases of teenage pregnancies were found panicking. Health status of the entire community was evaluated through home visits purposely for family health assessment. However, survey on family support was included when pregnant teenager is found utilizing a self-made data gathering tool after reliability test using Kuder-Richardson Instrument (rK–R = 0.99). Family member and the pregnant teenager were the target participants.

Follow-up interviews and observations were done to substantiate findings. Gathered data were subjected to statistical treatment using the Statistical Package for Social Sciences Version 22.0 (SPSS). To validate if there is significant difference on support given to pregnant teenager, independent-sample t-test was utilized. Five-point Likert scale was used in the interpretation of data. Findings were used to develop a health service program. Implementation of the developed health service program was done after pilot testing to places where the data were taken.

Results and Discussions

Unintended teenage pregnancy is an ever-present issue in developing countries such as the Philippines affecting the physical, emotional, social, and spiritual wellbeing of adolescent. This may bring the health of mother and child at risk. Alarmingly, though adult maternal deaths is decreasing in the Philippines, teenage maternal deaths is increasing. Ten percent of pregnant teenagers died according to the Philippine Statistic Authority while World Health Organization showed a high and increasing incidence of fetal death in Filipino mothers under 20.

Further, many of teenage pregnancies end in abortion. According to the Philippines Safe Abortion Advocacy Network (PINSAN), there are 600,000 induced abortions recorded each year where about one-third are adolescents. This is because of support insufficiencies not only in material or financial but more on social, emotional and spiritual.

Perspective on family support to pregnant teenagers

There are four common categories of support on wellness being extended to pregnant teenagers by the family. These are health needs that are essential to the wellbeing of pregnant teens and the baby at best. Though parents of pregnant teens sometimes feel angry or disappointed, they should try to offer support to their teen who is dealing with an unplanned pregnancy. These support categories were used in identifying the realities of Ifontoks family support whereas, physical wellbeing
is referring to wellness related to the maintenance of healthy body and seeking care when needed. Emotional wellness relates on how to understand feelings and to cope effectively with stress while social support helps an individual on dealing with others effectively and comfortably that can create a support network, and spiritual wellness allows an individual to develop a set of values that help seek meaning and purpose.

Table 1: Level of family support extended to pregnant teenagers

<table>
<thead>
<tr>
<th>Family Support</th>
<th>Pregnant Teenager</th>
<th></th>
<th></th>
<th>Family Member</th>
<th></th>
<th></th>
<th>Overall</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>M</strong></td>
<td><strong>DI</strong></td>
<td><strong>M</strong></td>
<td><strong>DI</strong></td>
<td><strong>M</strong></td>
<td><strong>DI</strong></td>
<td><strong>M</strong></td>
<td><strong>DI</strong></td>
<td><strong>M</strong></td>
</tr>
<tr>
<td>Physical Support</td>
<td>3.97</td>
<td>Hi</td>
<td>3.83</td>
<td>Hi</td>
<td>3.90</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Support</td>
<td>3.77</td>
<td>Hi</td>
<td>3.80</td>
<td>Hi</td>
<td>3.79</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td>3.36</td>
<td>Mo</td>
<td>3.32</td>
<td>Mo</td>
<td>3.34</td>
<td>Mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spiritual Support</td>
<td>3.07</td>
<td>Mo</td>
<td>3.10</td>
<td>Mo</td>
<td>3.08</td>
<td>Mo</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>3.54</td>
<td>Hi</td>
<td>3.52</td>
<td>Hi</td>
<td>3.53</td>
<td>Hi</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: M = Mean; DI = Descriptive equivalent; 4.21-5.00 = Very High (HV); 3.41-4.20 = High (Hi); 2.61-3.40 = Moderate (Mo); 1.81-2.60 = Low (Lo); 1.00-1.80 = Very Low (VL)

As gleaned from Table 1, the four categories of family support was perceived “high”. However, spiritual support was the weakest link among the four followed by the social support with weighted means of 3.08 and 3.34 respectively. Both were perceived as moderately extended that is considered a big deal. To wit, from the Asianparent Philippines, a 17 year old pregnant is scared, confused, and anxious. She claimed fears that her parents might hit her, disown and hate her. She is also worried about other people for they might judge, condemn, reject and avoid her. Further, she tried to find the courage to tell her parents, but the fear dominated. So she faced the growing panic and crushing uncertainties of teenage pregnancy on her own. Moreover, Jessica was one of the many vulnerable teenagers who became pregnant at age of 19 out of wedlock. She struggled with the stigma that often confronts pregnant teenagers. She kept her pregnancy a secret from friends and neighbors as much as she can for she thinks that they talk about her status. Dr. Emma Llanto who works in a government hospital claimed that most of the time, pregnant teenagers who consulted her are on their 16, 17 and 18 years of age. They do not have any idea how their bodies work, protect themselves, to talk to their partners about negotiating to use contraception, or have absolutely no idea on contraceptives. The worst is when many children get pregnant early because they lack family support. No parents’ proper guidance leading to some children grow up irresponsible. These are the sentiments that cried out the great need of these supports not only from the family but from each and every one. Considerably, it’s not the pregnant teenagers who really need supports but the entire family.

The finding is somewhat unbelievable because social and spiritual wellness is vital for it promotes psychosocial wellbeing of a pregnant woman. Hodgkinson and colleagues claimed that adolescent parenthood is associated with range of adverse outcomes for young mothers, including mental health problems such as depression, substance abuse, and posttraumatic stress disorder. Teen pregnant are likely impoverished and reside in communities to isolate themselves. There were times they feel rejected by their family, so they tend to stay away from the community that is a social disadvantage. Moreover, depression is common among pregnant teenagers. Feeling of being alone is common for they’re expecting that their friends even parents left them. They even don’t know how to communicate with their parents to ventilate emotions and an opportunity to express their fears, hopes, concerns, and questions without feeling judged. Moreover, the finding is quite unbelievable. However, follow up interview and observation proved the numerical data as some says “they are shy to show up with their circle of friends, keeping mum if their family members asked them especially during the first trimester where they kept on denying”. Some also planned of abortion and even think suicide but their moderate spiritual wellbeing touched
their conscience of not continuing.

**Significant difference on family support to pregnant teenagers**

Table 2 showed the difference on perspective of pregnant teenagers and their family members utilizing the independent-samples t-test.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant Teenager</td>
<td>3.54</td>
<td>.41</td>
<td>0.111</td>
<td>.915</td>
</tr>
<tr>
<td>Family Member</td>
<td>3.51</td>
<td>.37</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result revealed no statistical significant difference between the perspectives of pregnant teenagers and the family members. Therefore, the extent of support being extended is the same. Further, the difference in the mean of the participants is likely due to chance which signifies that the result is a strong source or instrument in developing a health service program to cater the needs of pregnant teenagers.

**Promotion of social and spiritual wellbeing: a health service program for pregnant women**

Teenage pregnancy is a global, social and health phenomenon where culture should be one of the indicators to consider. In this study, it was noted that social and spiritual wellness were moderately extended. This made the family support on social and spiritual health service program was developed. Social wellness is the positive effect of friendship to mental and physical health of an individual while spirituality is recognized as important constituent of wellbeing. The relationship between spiritual awakening and health of childbearing women and the unborn is far more intrinsic than we have imagined. The healthy dose of spirituality is essential for the tranquillity of the unborn life.¹⁶

During pilot testing, it was observed that some adult married pregnant women who are multiparous (had 2 or more pregnancies) or primiparous (first time pregnancy) experienced social disturbances. This is maybe due to hormonal imbalance but some claimed of non-acceptance of their physical appearance. While some have the feeling of being criticized due to conceiving of more kids without proper spacing. At this point, it is necessary for them to overcome these feelings to attain a systematic and harmonious life. Thus, it was decided to include them resulting to some revisions and adjustment on designed activities like clustering them according to age and number of pregnancies.

The health service program on social and spiritual wellbeing was initially extended to pregnant mothers and their significant other at barangay Balili, Bontoc, Mountain Province. It was conducted in collaboration with the local officials and health workers of the barangay. Schedule and venue of the mothers’ class was arranged and home visits were done twice a week for 3 weeks.

During mothers’ class, the dean of nursing discussed wellness and empowering of mothers, their families and circle of friends in the promotion of wellbeing. For the participants to socialize, facilitated communication was initiated followed by simple exercises that mobilized body parts which promoted circulation, then by group reading, and discussions and demonstration of therapeutic massage. Group reading focused on safe motherhood that initiated self reflection resulting to sharing of experiences for discussion. Moreover, teaching and return demonstration on therapeutic massage comes next which was considered a social support they can render. Further, spiritual journey from the darkness of stress is essential to achieve the light of happiness, mental peace and energy. Simple prayer was introduced that can definitely prove the boon of the mother and child’s affection; and the spiritual bonding between God and the mother resulting to a state where oneness is created.¹⁶ Moreover, arts appreciation (nature), listening to religious songs, and meditation were introduced and applied. Visiting the church was encouraged during home visits. Indeed, participants verbally claimed that the health service was considered a healthy habit not only for the pregnant but for the entire family. Improvements on socialization and spiritual outlook of each family was observed as manifested by closer family ties, a very welcoming environment, openness to share
learnings and experiences, willingness to listen on health teachings and participate to other health activities.

**Conclusion**

It is vital to empower families on how to extend full support on wellness to pregnant women. Further, good leadership and therapeutic communication is also necessary in the implementation of a service program which demands participation of people.

**Recommendations:**

The health service program should be continuously implemented. Other institutions with health academic programs and health concerns can adapt and strengthen its activities.

**Conflict of Interest:** This has no impartiality in its accomplishment.

**Source of Funding:** Personal

**Ethical Clearance:** Guidelines for the protection of human rights outlined in the American Nurses Association was observed.

**References**


The Description of Musculoskeletal Symptoms, Workstation Design Compliance, and Work Posture among Computer Users at Head Office Jakarta Year 2018

Sjahrl Meizar Nasri, Dita Maharani Kusumaningrum
1Department of Occupational Health and Safety, Faculty of Public Health, University of Indonesia

Abstract

Some previous studies showed that the number of musculoskeletal symptoms among the office workers who use computers was quite high. The musculoskeletal symptoms can be caused by the workstation design and work posture. Thus, this research aims to get the description of workstation design compliance against the OSHA guidelines, work posture, and brief description about musculoskeletal symptoms among computer users. This research utilizes descriptive method and cross sectional as design study. The workstation design (chair, desk, monitor, keyboard, mouse, and telephone) compliance against the OSHA guidelines was measured by using workstation design compliance checklist, work posture assessment and level of work posture risk were conducted by using ROSA (Rapid Office Strain Assessment) method. The brief description of musculoskeletal symptoms was conducted by interviewing the 83 respondents and completing CMDQ (Cornell Musculoskeletal Discomfort Questionnaire). The finding shows that bad postures among the office workers can lead to musculoskeletal disorders symptoms.

Keywords: Workstation design, Work posture, Musculoskeletal Symptom, ROSA, CMDQ

Introduction

Musculoskeletal disorders is one of the most common health hazards that caused by visual display terminals (VDTs) used in the workplace (1). Some previous studies showed that one of the major reasons for absence in the workplace is feeling pain in various parts of musculoskeletal systems (2). Reports in some previous studies suggested that computer users are at increased risk of upper extremity musculoskeletal disorders (MSDs) (3). The work-related MSDs also include illness and injuries and affects the human’s muscles, ligaments, tendons, nerves, soft tissues, and blood vessels (4).

Work-related musculoskeletal disorders are among health issues in work places of industrially developed and developing countries which mostly caused by long sitting and excessive leaning (2). They are also mainly caused by poor working posture or repetitive movements (1). Some epidemiologic studies presented that in term of work-related MSDs, the pain location and other signs probably related to standing posture and work habit (2).

In addition, a literature on the association between keyboard usage and prevalence of MSDs presented that hours spent for using keyboard predicted to be a risk factor for MSDs among the computer users (3). Previous research also identified that 50% of 136 computer users have lower back pain that cause of non-adjustable backrest on their seats (5). Another finding also showed that there was a positive association between hand-arm symptoms and the duration of mouse-use (6). Mouse position may be one of the critical factors in shoulder flexion and abduction that increase the risk of MSDs (7).

PT X is a company that operates in selling, renting and servicing the heavy equipment. Based on company data in 2015, the most dominant hazard that exposed the employees was the ergonomic hazard and 59.9% of 588 workers do their job with computers with

Corresponding author :
Sjahrl M. Nasri
C Building, Occupational Health and Safety
Department UI, UI Campus, Depok, West Java, 16424, Indonesia, E-mail: sjahrl.mn@gmail.com
Tel: +628-128-761-955

DOI Number: 10.5958/0976-5506.2019.00755.1
prolonged sitting. These workers also complained the musculoskeletal symptoms. Therefore, this research was conducted to get the description of workstation design compliance, the work posture, and brief description about the musculoskeletal symptoms among computer users in PT X.

**Method**

**Data Collection**

This research used cross sectional design study with descriptive method. The sampling technique use simple random sampling. This research was conducted at PT X that located in Jakarta from April until Mei 2018. The number of employees in PT X was 588 people. The inclusion criteria in this study was permanent employees in PT X that interact with computer while conduct their job, and did not have musculoskeletal symptoms or musculoskeletal disorder before work in PT X. On the other hand, the exclusion criteria were the employees that have musculoskeletal symptoms or disorder and the employees that absence when this study was conducted. The number of samples required was calculated by using Lemeshow formula and the result was the minimum samples needed for this study was 83 respondents.

**Research Design**

The workstation design compliance towards the OSHA Guidelines was measured by using workstation design compliance checklist. The OSHA Guidelines were translated into Bahasa by the researcher and without back translation. There were 20 items that measured by using OSHA guidelines, including the seat height, length of seat pan, width of seat pan, seat width, backrest and lumbar support, armrest, desk height, desk length, desk width, footrest height, footrest width, desk distance from floor, monitor height, monitor distance to the eyes of users, the visual comfortability, the keyboard height, keyboard distance to users, keyboard position, mouse distance to the users, and mouse height.

In addition, the level of work posture risk among the workers that interact with computer were assessed by using ROSA (*Rapid Office Strain Assessment*). ROSA is one of method to assess ergonomic risk factor related to work posture. A prior research showed that this picture based checklist was reliable and valid (9). ROSA also developed to quickly quantify the risk factors that correlated with computer work and recommend how the posture should be improved (9). On the other hand, in order to get brief description of musculoskeletal symptoms was conducted by interviewing the respondents and completing CMDQ (*Cornell Musculoskeletal Discomfort Questionnaire*). CMDQ is a questionnaire which also contain a body map diagram and questions about the prevalence of pain, musculoskeletal ach, and discomfort that experienced by the person during a week before (10). This method is suitable and reliable to be used in measuring the levels, duration, and frequency of musculoskeletal pain and discomfort (11).

**Statistical Analysis**

Data was analyzed by using SPSS 16.0 software package

**Results**

The findings on Figure 1 show that; 89.2% chairs were not accordance with OSHA guidelines. It presented that only 10.8% chairs that accordance with OSHA Guidelines. This incompatibility was found in the armrest of the chair which is not adjustable. Based on OSHA Guideline, the appropriate standard design of chair should have adjustable armrest. Based on the measurement of the desks, 95.2% respondents use appropriate desks. The incompatibility was found on the leg space and the foot space height, since the CPU was placed under the table and caused the limited space for foot to be rest. In addition, the space from desk to keyboard tray was close with workers legs with a higher knee sitting height.

There were 72.3% monitors which used by computer users and not accordance with OSHA guidelines. The placement of monitors were too low (less than 15 degrees), and some monitors for around 60 monitors were not up to the standard. In term of keyboard and mouse, it was found 38.6% of keyboard and mouse were not accordance with OSHA Guidelines, due to the placement of keyboard and mouse which is too far and not in reachable distance from the users. Also there was 37.4% the telephone position that not complied to the OSHA guidelines.
Based on Figure 2, the work posture that assessed by ROSA showed 92.8% (77 respondents) has bad posture toward armrest. It presented that the chair which did not have an armrest, has contribute to cause bad posture among the workers. Also there were 73.5% (61 respondents) and 50.6% (42 respondents) has bad posture towards back support and seat pan height. Due to work posture in using the monitors, the finding showed 67.5% (56 respondents) has bad posture toward computer monitor while working and 39.8% (33 respondents) has bad posture toward telephone while working.

Figure 3. Work Posture towards Work Station Design that may Contribute to The ROSA High Score

Furthermore, the findings on the Figure 3 also showed that 96.3% work posture toward armrest has significant contribution in term of high level of ROSA score. Arm position were too low, elbow were hanging and not supported properly by armrest, also the chair has non-adjustable armrest. Other result showed that 88.9% body leaning forward/part of vack and lumbar did not supproted by backrest. It also significantly contributed to the high level of ROSA score. There was 63% of work posture toward monitor while working has significant contribution regarding high level of ROSA score. The angle of computer monitor were too low (less than 30 degrees), and it caused the users need to tilt down their head while working.

The result of musculoskeletal symptoms survey using CMDQ completing by 83 respondents, showed 95.2% (79 respondents) had musculoskeletal system complaint. The result of complaints on the musculoskeletal system is divided into 4 based on the presence of complaints on the individual, the frequency of complaints on the musculoskeletal system in body parts, the severity of complaints on the body parts, the effect of complaints on the ability or productivity of work on one of the body parts. The result that there are 6 parts of the body which have the most complaints which can be seen on Figure 4.
**Discussion**

The findings showed that the bad posture which may cause the musculoskeletal symptoms on the six body parts (neck, lower back, upper back, right shoulder, left shoulder, and buttock) among the computer users. This result is similar with a prior study that presented the musculoskeletal symptoms most commonly occurred in the upper back, lower back, right shoulder, left shoulder, and also in the neck (2). The musculoskeletal pain were caused by the arm is not supported properly on the armrest (armrest too low and not adjustable), back and lower back are not supported properly therefore the computer users tend to leaning forward, neck tilt down during working with monitor due to monitor screen position that is too low, the prolonged sitting and static posture during interaction with computer activity that may lead compression fatigue especially in buttock. These findings are in accordance with the previous study which showed that the MSDs can be affected by prolonged sitting and static postures (2). The result also in accordance with the previous study which presented that non-adjustable backrest can increase the MSDs symptoms (5).

On the other hand, based on the ROSA score result, there were some factors that significantly contributed to the increasing risk of ergonomic factors, such as non-adjustable armrest which caused the elbow was not supported on armrests properly, the continuous leaning position, non-adjustable monitor which make the monitor was not as the same level as the eye, the bad posture of wrist when using the keyboard where the wrists flexed > 15° and cause the position of the keyboard being too high. The results are in line with the findings of prior study that showed MSDs can affect arms, elbows, and wrists (1). The other factors are the mouse position which was too far and caused the shoulders were not relax. This finding is in accordance with the previous research which presented that the shoulders flexion and abduction can be affected by mouse position and increasing the risk of MSDs (1). Furthermore, another factor are the bad posture towards the seat pan height and seat pan depth. The seat was too high and caused the knee angle > 90°. Based on OSHA guidelines, knee angle of sitting position should be 90°. Most of the computer users in PT X tend not to adjust the seat pan height properly, however the design of chair height is meet OSHA guideline (can be adjusted 41-52 cm height). Work posture against seat pan depth also has contribution of high ROSA score, where the distance between the tip of the cushion with the knee more than 3 cm although the depth of the cushion seats used by the respondent meet the OSHA guidelines (42 cm).

Based on the findings of this research, it was found that though the workstation design already complied with the standard but the workers still doing the bad postures then the risk of MSDs is still likely to increase. Hence, the awareness training of bad postures should be conducted. Besides, the company is suggested to design the workstation by considering the OSHA guidelines. Work-related musculoskeletal disorders can only be accurately prevented if the exposures are identified correctly (3). In addition, the intervention is also needed since a previous research showed that the prevalence rates of musculoskeletal problem was lower after the intervention conducted (4).

**Conclusion**

This study provides description that most of the workstation design in PT X was not complied to OSHA guidelines. Bad posture also contributes to the increasing risk of MSDs symptoms. Appropriate work design and awareness training should be implemented to reduce musculoskeletal symptoms among the computer users.

**Acknowledgement:** An earlier version of this manuscript has been presented as a poster in 1st International Conference on Global Health.

**Conflict of Interest:** None.

**Ethical Clearance:** Ethical clearance was obtained from Public Health Faculty, Universitas Indonesia No 685/UN2.F10/PPM.00.02/2018.

**Source of Funding:** Self-funded

**References**

3. Gerr F, Marcus M, Monteilh C. Epidemiology of musculoskeletal disorders among computer


Samban as a Complementary Immunization in Dayak Pitap Tribe in Indonesia (A Preliminary Study)

Ida Hastutiningsih¹, Oedojo Soedirham²

¹Doctoral Student of Public Health Program, Faculty of Public Health, Airlangga University, Surabaya, Indonesia, ²Lecturer, Department of Health Promotion and Behavior Science, Faculty of Public Health, Airlangga University, Surabaya, Indonesia

Abstract

The low uptake of fully immunized children in Dayak Pitap tribe has a probability to be caused by the community belief about the sources of illnesses which are natural causes, spirit of ancestor causes, shamanism causes, breaking taboos causes and other supra natural causes rather than biomedical ones. This belief therefore has an implication on the initiatives that they use to prevent illness including the use of a samban for their children.

However, the savor of samban that is believed by the community members not just a superstition. It has a role in develop well functioning immune system and make a child in the Dayak Pitap tribe physically healthy because immune system need support from psychosocialcultural construct to perform well functioning immune system and a samban play a role in this construct. Furthermore a samban also play a role in building the mental and social construct to developed what WHO determine as health is well being.

This qualitative preliminary study was conducted in Dayak Pitap indigenous tribe in Balangan District, South Kalimantan Province, Indonesia. Dayak Pitap tribe is one of tribe in Dayak Meratus or Dayak Bukit tribe family in South Kalimantan who settle down throughout the Meratus highlands in South and East Kalimantan Province.

The aim of this paper is to describe and discuss the concept of the samban that can be considered as complementary immunization in Dayak Pitap tribe, South Kalimantan Province in Indonesia.

Keywords: samban, amulet, complementary immunization, Dayak tribe, indigenous tribe

Introduction

Immunization has been well known as the most successful and cost effective health intervention achievement in the modern world and has saved countless of children’s lives and has increased health status in the world (¹). Contrary to this achievement, in the recent year there are increasing numbers of not fully immunized children both in the developing and also in the developed countries (²). This similar situation also happened in Dayak Pitap Tribe Indonesia.

Based on the depth interviews that have been conducted along in this study, the reason for this low uptake of basic immunization in this tribe probably because of the community belief about the causes of illnesses which are natural causes (heat, cold, rain), spirit of ancestor causes, shamanism causes, breaking taboos causes and other supra natural causes. This belief therefore has an implication on the initiatives that they use to prevent illness including the use of a samban for their children.

Stated by the balians, the traditional healer, and also by community members this samban proven to be work...
properly in protecting their children from an illness. Somehow, it has a same purpose with the immunization in western concept which is to keep the children healthy.

The aim of this paper is to describe and discuss the concept of the samban that can be considered as complementary immunization in Dayak Pitap tribe, in Balangan district South Kalimantan Province in Indonesia.

Material and Method

This qualitative preliminary study conducted on February to July 2017. Data was collected based on in-depth interviews with 2 (two) baliains, head of Dayak Pitap tribe, head of village, village health volunteer and mother of 13 – 36 months old children. All the material was recorded in field logs, and some was tape recorded. Unstructured interviews and observation were carried out.

Results

Dayak Pitap tribe with total population around 1,653 inhabitants is one of the tribes in the large Dayak Meratus or Dayak Bukit tribe family who settle down throughout the Meratus highlands in South and East Kalimantan Province in Indonesia. This tribe settles in 5 villages in Tebing Tinggi sub district’s of Balangan in South Kalimantan province which are Langkap, Ajung, Kambiyain, Iyam and Mayanau.

Although this tribe registered as Hinduism which is called Hindu Kaharingan, very little aspect of Hinduism exists in their everyday lives. They still maintain their belief and culture as animism and dynamism tribe.

Most of Dayak Pitap people plant rice, supplemented by the sale of the product of planted rubber tapping, vegetables and other field or forest products, hunting and some educated community members also become employees in coal mining companies or government officers. However, even if they already have other occupations they still have to do the shifting rice cultivation because of the obligation for participating in the yearly harvest feast called Aruh Ganal especially for the parents of the samban children.

Even though they have already less isolated and have access to health professional, the tribe still maintain some traditional ways of life especially in health care seeking behavior including health prevention for their children.

WHO Concept of Health

Though culture vary in their definition of health and illness but the common notion that health is more than only the physical state of the body or the absence of illnesses has long been heard all over the world. Health is a whole, health is a completeness, health is life itself (3) which actually have been covered by WHO in its definition of health which is “a state of complete physical, mental, and social well-being and not merely the absence of disease and infirmity” (4). In this holistic definition WHO provided popular dimensions of health namely physical, mental and social (5)(6). A person consider healthy not only if he or she is not getting a disease, infirmity, limitation in the ability to perform self care activities, difficulty in mobility and carry out other physical activities but also to be able feel good during life time, enjoyment and inbound in social relationship and play a healthy social role in the community.

Using some kind of amulet both for protection and curing not only known in Dayak Pitap tribe but also widely known in many traditional cultures such as in Narsinghdi district in Bangladesh (7), in Bedouin tribes of the Negev Southern Israel, Middle East (8), in Gaddis of Bharmour Himachal Pradesh, India (9) and most of tribal communities worldwide especially for the children (10).

Immunization Western Concept and Immune System

Western concept of immunization well known to be started when Edward Jenner developed the world’s first vaccine from cowpox to protect human against smallpox (11) This concept then followed by the born of the concept of immune system in the late of nineteen and early twenties coincided with the germ theory of disease development which is credited to Pasteur and Koch (12).

Immunization by WHO is defined as “the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine”. Vaccine help developed immunity by imitating an infection although this kind of infection does not cause a serious illness such as happened in natural infection but it does cause the immune system to produce T-lymphocytes and antibodies (13) and provide a supply memory for the body in how to fight this infection in case the real infection attack the body in the future. However, some vaccines need more than one dose to be
effective and others may wear off and need booster to bring the immunity levels back up.

The immune system itself initially defined as an internal physiological system that protects or defends our bodies against a potentially hostile pathogenic germ but based on more recent studies this concept develops and popularizes as the system that not only protects against infection and disease but also as the system that actually keeps people healthy (12), which is actually in line with Dubos’s criticism about the germ theory in 1955 “everyone harbors diseases germs, yet not everyone is sick”, suggesting that germs are less important in disease than other fact affecting the condition of the host (14). Well functioning immune system not only merely about immune system but also relates with psychosociocultural constructs of immune system.

The Samban Concept as Complementary Immunization

A samban worn as a necklace and believed can protect children from illnesses and keep them healthy which is quite similar with the function of immunization in western concept.

There are several types of samban i.e. samban anggit made from copper, samban anak made from some kind of clamshell, batu lunta made from some kind of stone, samban picis made from old coin single or double, gigi pitayab made from a small turtle’s tooth, kalandang lawa kuning made from some kind of mystical yellowish rope/string that believed to be disappear after being worn around the child’s neck, and the highest and oldest one is samban layang which is a rope made from bark of tarap tree Artocarpus odoratissimus.

Only the signed children can wear this samban namely a sign from the birth of the child which is the umbilical cord wrapped around a child’s neck, easily cries and also easily getting ill could be mild illness such as mild fever, stomatitis, zero growth and other illnesses that is considered as a sign that needs to be determined further by a balian. A child that has a line of descent using a samban, both from his or her father or mother line also obligated to wear it.

Stated by a balian who is also the head or the tribe that usually in age 1 to 2 months if a child has the signs as mentioned above then the parents will ask a balian to conduct a ritual called batanung. As the result from this ritual, it will be known whether the illness of the child because asked to use a samban or not and what kind of samban that asked to be worn by their Almigthy God, Nining Baharata. At the end of this ritual the parents will make a pray to the God asking for the cure of their child and pledge that they will conduct ritual basamban if their child is cured from the illness. Stated by the balian and head of Kambiyain village that most children really getting well after this batanung ritual and after 2 - 12 weeks, depending on the family’s affordability, then the basamban ritual will have to be conducted.

The preparation for this basamban ritual will be run by the whole village. In the ritual the balian will spell mantras and dance accompanied by rhythms made on drums from 7 pm to 9 am in the morning. In this ritual, the spirit that is believed has annoyed the child will be transferred to a set of wooden doll that will be dissolved in a river or other places, then the ceremony will continue with the fixing of the samban to the child’s neck.

After this ritual is finished, the parents and the child will have to go through a period of abstinence which makes them not allowed to go out of their houses, not allowed to have visitors and also not allowed to defecate for 24 hours. This 24 hours period believed to be a period to sharpen the savor of the samban as the child’s protector from illness in the next future and also because the spirit that has been called in the basamban ritual is believed still roam nearby. Every year in Aruh Ganal, every child who wore samban along with their parents will be spelled with mantra again and the samban will be oiled by the bilians in order to re-strengthen the savor of the samban.

Discussion

Immunization’s function in western concept is to develop immunity commonly by utilizing vaccines. Vaccines help develop immunity by imitating an infection (13). Naturally, when first time human body attack by a germ, it can take several days to make and use the germ’s fighting tools needed to pass though the infection. After this infection, the immune system remembers how to protect the body against that disease. In the future if the body attack by same germ a few T-lymphocytes that the body keeps from the first infection, called memory cells will go into action quickly and then when the familiar antigens are detected, B-lymphocytes produce antibodies to attack them. Infection causes by immunization
usually mild such as fever but infection cause by natural infection can be severe and lead to hospitalization or even death.

However recently research also found that in order to perform physical health it is not merely about immune system but more on how this immune system has adequate function or well functioning immune system that also determine by psychosocialcultural aspects. Immune system is more than only a defense system. Physical health can be viewed as effectiveness and well functioning immune system. Psychologically feeling good and full of vitality are associated with well functioning immune system whereas feeling lethargy or fatigue are considered to be indicative of inadequate immune system activity and culture has a role in shaping individual psychological capability such as methods of handling psychological aspect like emotion and manner of expression.

The samban, based on western medical science not yet scientifically proved to be contributed in developing the immune system but definitely contributed in developing well functioning immune system. Wearing a samban fulfills the social construct needed to perform well functioning immune system and also comply their psychological need because the tribe view samban as the initiatives that have already proved to be inherently worked in protecting their children compared with the western concept of immunization. A samban also comply their spiritual need because the tribe also view a samban as a form of their faith to their God. Wearing a samban also provides secure feeling because after this ritual basamban the health of the child will become the responsibility of the balian until it is un-worn.

Furthermore, refers to WHO definition that health is well being, beside physical health construct to be consider as healthy person one has to fulfill the mental and also social construct. What is offered by the western concept of immunization could potentially have a role to encompass the physical dimension of health but doubtful in covering the other dimensions which is precisely could be encompass by the samban which make the samban could be consider as complementary immunization.

Conclusions

It is important to take a note that to develop what WHO stated as “health as well being” in the Dayak Pitap tribe, this immunization in western concept must be accordance with a samban as a complementary immunization. The samban has a role in develop well functioning immune system and make a person can perform physical health with its role as part of psychosocialcultural construct of well functioning immune system. Furthermore, the samban not only has role in building the physical construct but also mental and social construct to developed health as well being. Trying to eliminate the samban in order to promote fully immunize children may be ended with imbalance milieu and worse health condition.

Health professionals also can view the samban as an entry point and opportunity to discuss western concept of immunization with the community members and also the baliens because the fact that they are also thinking about the same issue which is the prevention of an illness. With this kind or approach, the opportunity to reach high uptake of fully immunized children could be more possible to be gained.

Conflict of Interest: There is no conflict of interest for both authors.

Source of Funding: This research funded by the authors themselves. No other financial support received.

Ethical Clearance: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Health Research Ethics Committee Faculty of Public Health Airlangga University.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

References

3. Bambra C, Fox D, Scott-samuel A. Towards a


Factors Influencing the Participation of National Health Insurance Independently
(Analytic Observational Study on Work Area Sungai Malang Primer Health Care Hulu Sungai Utara Regency)

Ary Nugraha¹, Nida Ulfah², Mohammad Isa³, Bahrul Ilmi⁴

¹Cahaya Bangsa Institute of Health Science, ²Public Health Study Program, Medical Faculty, Lambung Mangkurat University, ³Ulin Banjarmasin General Hospita Area, ⁴Health Polytechnic of Banjarmasin

Abstract

Health insurance is a guarantee of health protection for everyone, 90% of Indonesians are already JKN participants. The coverage of JKN participation, especially in South Kalimantan is still low, namely 1,323,001 people (34.8%), one of the districts whose membership level is still low, namely Hulu Sungai Utara Regency with 49.65% from 225,822 is not yet a JKN participant especially in the work area of Sungai Malang Primer Health Care where only 12,387 people (25.67%) are JKN participants. Therefore it is necessary to investigate what factors affect the participation of JKN. Explain factors that influence the participation of National Health Insurance independently in the working area of Sungai Malang Primer Health Care. This research type is observational analytic research with design of case control design conducted by work area of Sungai Malang Primer Health Care. The populations were JKN participants and not JKN participants, while sampling using purposive sampling. The research variables are age, education level, knowledge, income, motivation, perception and socialization as independent variable and JKN membership independently as dependent variable. The research instrument used is the stuffing sheet. The result of multiple logistic regression analysis obtained the most influential variable is age (OR=9,8). There is a significant influence, level of education (P-value=0,000), knowledge (0,000), motivation (0,000), perception (0,000) and socialization (0,000).

Keywords: national health insurance, social insurance provider body, participation

Introduction

Health insurance is a guarantee in the form of health protection for the community to benefit health care and protection in fulfilling basic health needs given to every person who has paid the dues or fees paid by the government¹. There is a Social Security System in the amendment of the 1945 Constitution, and the publication of Law No. 40 of 2004 on the National Social Security System (SJSN) that every person has the right to social security to be able to meet the basic needs of a decent life and improve his dignity towards the realization of a prosperous, just and prosperous Indonesian society becomes a strong proof that government and related stakeholders have a great commitment to realize social welfare for all its people².

In support of the implementation, Law no. 24 Year 2011 establishes the National Health Insurance (JKN) organized by BPJS, which consists of BPJS Health and BPJS Employment. JKN held by BPJS Kesehatan whose implementation begin on January 1, 2014³. Social Security Administering Body (BPJS) as the implementing agency has done various activities to accelerate JKN roadmap travel process so universal health coverage (UHC) quickly achieved. Socialization in various mass media about the benefits, payment method, the amount of dues chosen according to ability, has been implemented, but the expected result that there will be increasing independent participant not seen real⁴.

DOI Number: 10.5958/0976-5506.2019.00757.5
Data Ministry of Health RI (2013), shows the number of people who are guaranteed in various forms and health insurance as much as 151.6 million out of a total of 293.7 million people in Indonesia. Thus there are still 142.1 million people in Indonesia who do not have health insurance. Based on data of Social Security Administration Agency (BPJS) Health (2015), South Kalimantan Province of the total population of 3,989,793 people in the JKN membership coverage of 1,323,001 people (34.8%), consisting of 763,063 people (57.67%) of the contribution beneficiaries (PBI) and non PBI 559,938 inhabitants (42.32%)\(^5\).

Based on data on the coverage of the working area of each Primer Health Care in Hulu Sungai Utara District, the Sungai Malang Health Center has the working area with the largest number of residents from other working areas and has the lowest percentage of JKN participation in Hulu Sungai Utara Regency. The number of JKN participants at the Sungai Malang Primer Health Care was 12,387 people as of June 2016 with the coverage of the working area 47,961 residents in Amuntai Tengah subdistrict, meaning only 25.67% of the population in the working area of Malang River Community Health Center which is the participant of JKN which means 75.43% of the people in the region have the potential to become the most independent JKN participants.

### Material and Method

The research is a kind of quantitative observational analytic research with case control approach. Type research is done by comparing case groups and control groups. The number of samples in this study is determined by purposive sampling method. The number of samples in study as much as respectively 130 respondents, which means the total sample in study was 260 respondents.

### Findings

Table 1: Result of Univariate Analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>18-40 year</td>
<td>181</td>
<td>69,6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41-65 year</td>
<td>79</td>
<td>30,4</td>
</tr>
<tr>
<td>2</td>
<td>Level of education</td>
<td>Primary school</td>
<td>23</td>
<td>8,1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Junior high school</td>
<td>57</td>
<td>26,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Senior High School</td>
<td>99</td>
<td>37,6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>College</td>
<td>81</td>
<td>30,8</td>
</tr>
<tr>
<td>3</td>
<td>Knowledge</td>
<td>Less</td>
<td>157</td>
<td>59,7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>103</td>
<td>39,2</td>
</tr>
<tr>
<td>4</td>
<td>Income</td>
<td>Low Income (≤ Rp 2,085,000)</td>
<td>171</td>
<td>65,8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Higher Income (&gt; Rp 2,085,000)</td>
<td>89</td>
<td>34,2</td>
</tr>
<tr>
<td>5</td>
<td>Perception</td>
<td>Low</td>
<td>78</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>182</td>
<td>70</td>
</tr>
<tr>
<td>6</td>
<td>Motivation</td>
<td>Low</td>
<td>148</td>
<td>56,9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>112</td>
<td>43,1</td>
</tr>
<tr>
<td>7</td>
<td>Socialization</td>
<td>Not</td>
<td>136</td>
<td>52,3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is</td>
<td>124</td>
<td>47,7</td>
</tr>
</tbody>
</table>
Based on table 1 can be seen that of 260 respondents consisted of 18-40 (adult) age range 181 respondents (69.6%) and respondents with age range 41-65 (old) as much as 79 respondents (30.4%). Respondents can be seen in this study more than the range adult, this is because respondents with age range 18-40 is still productive and have a job. High school education level has the highest percentage (37.6%) this matter because respondents in this research is participant by JKN independently which majority is entrepreneur. Of the 260 respondents, 157 respondents (59.7%) had less knowledge about JKN. Based on the results of the questionnaires of respondents who have less knowledge due to the respondents do not know the benefits obtained when a participant JKN as many as 155 people (97.4%), who do not know who is required to become a participant JKN as many as 155 people (97.4%), (94.7%) who do not know the purpose of BPJS Health (94.7%), who do not know the participants JKN consists of as many as 153 people (94.7%), who do not know the purpose of JKN as much as 153 people (94.7%), who do not yet know the number of JKN participants as many as 151 people (92.1%), who do not yet know how to register become JKN participants for PBPU counted 145 people (86.8%), not yet know the procedure of registration of JKN as many as 122 people (73, 7%), who do not yet know the requirements to become a participant of JKN for Indonesian citizens are 95 people (68,4%).

Income low (≤ Rp 2,085,000) more reported on the type of work in the informal sector with uncertain income each month. Concerned perceptions, 80 respondents (30.7%) assume that the facilities provided if the illness is incomplete, as many as 120 respondents (46%) assume that BPJS is only for the poor. Respondents have low motivation caused by those who say that does not agree that the way of registration as JKN participants is easy.

Table 2. Bivariate Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>JKN Independently Active Participation</th>
<th>p-value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not a Participant</td>
<td>Participants</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Control)</td>
<td>(Case)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Adult (18-40 tahun)</td>
<td>98</td>
<td>75.4</td>
<td>83</td>
</tr>
<tr>
<td>Old (41-65 tahun)</td>
<td>32</td>
<td>24.6</td>
<td>47</td>
</tr>
<tr>
<td>Level of education</td>
<td>Low</td>
<td>17</td>
<td>13.07</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>113</td>
<td>86.92</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Less</td>
<td>105</td>
<td>80.8</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>25</td>
<td>19.2</td>
</tr>
<tr>
<td>Income</td>
<td>Low (≤ rp 2.085.000)</td>
<td>78</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Higher (&gt; rp 2.085.000)</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>Perception</td>
<td>Low</td>
<td>130</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Motivation</td>
<td>Low</td>
<td>130</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Socialization</td>
<td>No</td>
<td>100</td>
<td>76.9</td>
</tr>
<tr>
<td></td>
<td>There is</td>
<td>30</td>
<td>23.1</td>
</tr>
</tbody>
</table>
Based on table 2 above, the result of chi-square test with 95% confidence level, there is a significant influence, level of education (P-value=0,000), knowledge (0,000), motivation (0,000), perception (0,000) and socialization (0,000).

Table 3 Results the initial model of multiple logistic regression analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Variabel</th>
<th>B</th>
<th>Sig</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>2.283</td>
<td>0.023</td>
<td>9.807</td>
</tr>
<tr>
<td>4</td>
<td>Level of education</td>
<td>-2.270</td>
<td>0.019</td>
<td>0.103</td>
</tr>
<tr>
<td>3</td>
<td>Income</td>
<td>0.235</td>
<td>0.749</td>
<td>1.265</td>
</tr>
<tr>
<td>4</td>
<td>knowledge</td>
<td>1.869</td>
<td>0.021</td>
<td>6.483</td>
</tr>
<tr>
<td>5</td>
<td>Perception</td>
<td>-19,181</td>
<td>0.996</td>
<td>0.000</td>
</tr>
<tr>
<td>6</td>
<td>Motivation</td>
<td>-22,248</td>
<td>0.994</td>
<td>0.000</td>
</tr>
<tr>
<td>7</td>
<td>socialization</td>
<td>1,422</td>
<td>0.061</td>
<td>0.938</td>
</tr>
</tbody>
</table>

Table 4. Results of final model of multiple logistic regression analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Variabel</th>
<th>B</th>
<th>OR</th>
<th>95% CI OR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age</td>
<td>2.283</td>
<td>9.807</td>
<td>1,129-69,423</td>
<td>0.023</td>
</tr>
<tr>
<td>2</td>
<td>Level of education</td>
<td>-2.270</td>
<td>0.103</td>
<td>0,174-11,392</td>
<td>0.019</td>
</tr>
<tr>
<td>3</td>
<td>Income</td>
<td>0.235</td>
<td>1.265</td>
<td>0.299-5.344</td>
<td>0.749</td>
</tr>
<tr>
<td>4</td>
<td>knowledge</td>
<td>1.869</td>
<td>6.483</td>
<td>1,428-35,972</td>
<td>0.021</td>
</tr>
<tr>
<td>5</td>
<td>Perception</td>
<td>-19,181</td>
<td>0.000</td>
<td>0,000</td>
<td>0.996</td>
</tr>
<tr>
<td>6</td>
<td>Motivation</td>
<td>-22,248</td>
<td>0.000</td>
<td>0,000</td>
<td>0.994</td>
</tr>
<tr>
<td>7</td>
<td>socialization</td>
<td>1,422</td>
<td>0.938</td>
<td>0.880-16,113</td>
<td>0.061</td>
</tr>
</tbody>
</table>

Based on table 4 can be seen that the most influential variable is age, meaning that the more mature one's age then 9.8 times have the opportunity to become participants of health insurance independently.

**Discussion**

Based on table 2, to see the effect of age on JKN membership independently that, p-value= 0,059, means there is no significant influence between age with JKN membership independently.

The results of this study is supported by the results of previous research by Widhiastuti (2015) which states there is no significant influence between age with public awareness in insurance. Research with similar results was also revealed by Anggi Afifi (2014). In this study sampling was conducted only in primary health care, so there was no significant difference in health risks between respondents aged <40 years and ≥40 years, where they were more likely to experience low health risks.

Education of the 130 respondents who are not independent JKN participants, there are 113 respondents (86.9%) have high education level, while JKN membership comes from education level ≤ junior high school and college level only 24.6% and 26.9% which means lower levels of education are more likely to choose to be JKN participants. From these findings it can be seen that the level of education has no effect on knowledge. In addition, respondents with low level of education have concerns in terms of income due to their low employment rate (traders) as much as 218 respondents (82.9%). The effect of education with JKN participation independently, p-value=0,000, which means there is a significant influence between education with JKN membership independently. The value of OR=0.16 indicates that a person with a low educational...
level is 0.16 times more likely to be an independent JKN participant than someone with a higher level of education. The results of this study in line with the results of research conducted by Siswoyo BE (2015) there is a relationship between the type of work with the awareness of being a participant JKN. Respondents with unpredictable jobs and income are more interested in becoming JKN participants to ensure their health.

The effect of JKN self-knowledge and membership, that p-value = 0.000. The OR score indicates 6.3 which means that respondents who have high knowledge about JKN independently will have 6.3 times more chance to become independent JKN participants compared with those who have less knowledge about JKN. The results of this study in line with the results of research Tanjung (2015) there is a meaningful influence between knowledge with attitude JKN independent participation. Respondents’ knowledge of JKN includes understanding, understanding of participants regarding BPJS, JKN, JKN membership and benefits gained.

As many as 71.5% of JKN participants came from respondents who have income <Rp.2.085.000, whereas respondents who have total income> Rp.2.085.000 per month only 28.5%. Based on the findings in the field of respondents with income of ≤Rp 2,085,000, more are based on the types of jobs in the informal sector with uncertain income each month. Uncertainty about income is what affects a person to ensure his health by deciding to become a participant of JKN, another factor high income level of income is found to be meaningless. The researcher’s assumptions are caused by the National Health Insurance program is a social health insurance, in which membership is mandatory for all Indonesians in meeting basic health needs. The implementation of this program has been adapted to the economic capacity of the people. This research is in line with the Whidiastuti (2015) study which stated that the respondents’ income in this study did not affect the JKN participation independently.

Perception is very closely influenced by perceived benefits. Based on the theory of Kurt Lewin (1951) that changes in one’s behavior is influenced by the driving factors and inhibiting factors. When a person’s perception of a program’s benefits is high, it will be said to be a driver toward the desired goal. This drive will be strengthened if the perception of resistance as an inhibiting factor is found low, then the behavioral change toward the desired goal will be faster. The results of this study in accordance with the Health Belief Model where the change in behavior in respondents is influenced by the belief of the benefits or obstacles perceived. High perceptions of benefits and the discovery of low barriers of perception will lead to changes in respondent behavior.

There is a significant influence Motivation on JKN independently membership. The OR score indicates 8.22 which means that a person with high motivation has an opportunity to become a JKN participant compared to someone with low motivation. This research is in line with the results of Hardini’s (2016) research, motivation related to the participation of the national health insurance program because of the ease of registering, socialization, information received, the availability of health facilities, the health costs covered, and the protection of old age.

P-value = 0.000. There is an influence of JKN socialization on independent participation. Based on the table can be seen from 130 respondents who are not independent JKN participants, there are 100 respondents who have never received socialization related to JKN. Based on the findings in the field, respondents who are not independent JKN participants claimed to have never received socialization directly by the BPJS Amuntai Branch. In addition to direct socialization, respondents also have not received socialization through other media (print or electronic). Based on table 5.1.4 shows 59% of respondents have knowledge about JKN is still low which means still lack of socialization about JKN. Another thing is because most of the respondents who are not independent JKN participants are informal workers / SMEs. This is in line with research conducted by Fajar (2012) on MSME workers who get information that the respondents only know the program JKN as much as 21%, while those who do not know 62%. This indicates that massive socialization of the program is still needed, especially for the lower middle class, working in the informal sector and MSMEs.

**Conclusion**

1. There is no influence of age, income of respondents to the participation of National Health Insurance independently in Sungai Malang Primer Health Care
2. There is influence of educational level, knowledge, perception, motivation and
socialization of National Health Insurance participation independently in Sungai Malang Primer Health Care.

3. The most influential factor of logistic regression analysis is age to the participation of National Health Insurance independently in Sungai Malang Primer Health Care

**Ethical Clearance:** this study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical clearance and informed consent. The informed consent included the research title, purpose, participant’s right, confidentiality and signature.

**Source Funding:** This study done by self funding from the authors.

**Conflict of Interest:** The authors declare that they have no conflict interest.

**References**


Prevalence and Perception of Women about Consanguineous Marriage in Al-Ramadi City

Badeaa Thamer Yahyaa¹, Mustafa Ali Mustafa Al-samarrai¹, Saad Ahmed Ali Jadoo²

¹Department of Family and Community Medicine, Faculty of Medicine, Anbar University, Anbar, Iraq, ²Department of Public Health, Faculty of Medicine, Bezmialem Vakif University, Istanbul, Turkey

Abstract

Background: Consanguineous marriage is a common phenomenon in many communities and often related to several of undesirable health consequences. This study aims to study the prevalence and determinants of consanguinity and the perception and knowledge of women about the risk associated with it.

Methodology: A cross-sectional study was carried out at the outpatient (OP) clinic in the Teaching Hospital of Maternity and Childhood, Al-Ramadi city, Anbar province, Iraq. A convenient sample of one hundred fifty married women who were interviewed over the period from 1st February to 30th March 2018.

Results: The mean age (±SD) was 39.0 (±12.8) years. About two third (64.6) of marriages were consanguineous and 36.6% of which were between first cousins and 14.7% had a child with genetic disease or disability. Consanguinity has a negative and significant association with women’s education. Positive attitude towards inbreeding was 64.7%, however only 34.3% knew that it leads to genetic diseases. About 77.0% preferred to receive information about the risks of inbreeding and 94.7% to have medical examination before getting married.

Conclusion: Although consanguinity is commonly practiced and accepted in Iraq, the awareness of mothers towards the related health consequences to their offspring remains low.

Keywords: Consanguineous Marriage, Prevalence, knowledge, Perception, Iraq

Background

Consanguineous marriage (inbreeding) is a customary practice among wide variety of societies all over the World. Consanguinity is defined as marriage between blood relatives¹. Inbreeding is most likely related to significant increase in the prevalence of childhood disability rate and the reproductive mortality rate². Several of inherited and gene-related disorders and adult-related diseases have been reported among births of consanguineous marriages³. The impact of consanguinity is directly proportional to the degree of kinship, and the possibility of transferring the defective gene becomes more liable between close relatives⁴. However, such marriages considered a social behavior represented in the desire of nearly one billion of current world populations to marry relatives⁵. Reasons behind such behavior have been widely discussed. Religion and the economic situation were the main reasons pushing family toward the consanguinity⁶. Factors that determine the consanguinity may vary and change according to the change of society, but generally are revolving around “the socio-economic levels, education and rural versus urban setup”⁷. In the Arab countries including Iraq, the society tends towards tribal grouping even within the large cities, and therefore the rate of consanguineous marriage is relatively high compare to other regions of the world⁸.

Indeed, during the last two decades, many valuable studies have been conducted in the Arab region, but
some countries, including Iraq, still lacking information or even recent data to assess the development of society towards this subject. This study aims to estimate the prevalence and the determinants of consanguineous marriage in Al-Ramadi city in Iraq, and the perception and knowledge of women about the risk associated with it.

Method

Study Design

A cross-sectional study was conducted at the outpatient (OP) clinic of the Teaching Hospital of Maternity and Childhood in the Ramadi city, Anbar province, Iraq. A convenient sampling technique was recruited to collect sample of one hundred and fifty women over the period from 1st of February to 31st March 2018. All the Iraqi citizens, married women who were visiting the OP clinic (prenatal, gynecologic, neonatal and pediatrics clinics) and willing to participate were included. However unmarried women and medical staff were excluded as well.

Data Collection

A well trained data-collection team was recruited to interview the eligible participants using a specially designed questionnaire. The questionnaire was in Arabic language and was pilot tested with 15 women out of the used sample. The questionnaire included three parts; part one was socio-demographic and reproductive data; part two included the degree of consanguinity; part three included knowledge and attitude of women towards consanguineous marriage.

Statistical analysis

Statistical analysis was performed with SPSS 16.0 (Statistical Package for Scientific Studies) for windows. Data was presented in the form of percentages, mean, standard deviation (SD) values. Chi-square (χ²) analysis was used for rate comparison. Statistical significance at level p≤0.05 was used when required.

Results

Descriptive analyses

The mean age (±SD) was 39 (±12.8) years and the age at marriage was 21.5(± 4.1) years. Half of the women (75, 50.0%) were married at the age group of 15-19 years. About two third (64.0%) of women had low education (illiterate and primary), while the highest proportion of husbands (30.7%) were at a higher education level (university). The vast majority (87.3%) of women were housewives, compare to 44.7% of husbands were self-employed. About 67 (44.7%) women were having 5 children or more, however 42.0% experienced abortion at least once. History of child deaths were reported among 34% of the participants. About two third (97, 64.6%) of marriages were consanguineous; 58 (38.6%) of which were between first cousins. The degree of consanguinity for wife parents and for husband parents were 57.3% and 62.0% respectively. There was no significant association between all measured variables and the state of consanguinity, except for the level of education of the surveyed women which was significantly higher (p=0.000) among the non-consanguineous marriage group compare to the consanguineous marriages (Table 1).

Table 1: Association of consanguineous marriage with socio-demographic and reproductive variable

<table>
<thead>
<tr>
<th>variable</th>
<th>Categories</th>
<th>Consanguineous marriage N (%)</th>
<th>Non-Consanguineous marriage N (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of sample</td>
<td>&lt; 20-29</td>
<td>20(21.3)</td>
<td>9(16.1)</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>30(31.9)</td>
<td>22(39.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40+</td>
<td>44(46.8)</td>
<td>25(44.6)</td>
<td></td>
</tr>
<tr>
<td>Age at marriage</td>
<td>&lt;15-19</td>
<td>61(64.9)</td>
<td>32(57.1)</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>31(33.0)</td>
<td>22(39.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30+</td>
<td>2(2.1)</td>
<td>2(3.6)</td>
<td></td>
</tr>
<tr>
<td>Education of women</td>
<td>Low</td>
<td>58(61.7)</td>
<td>37(66.1)</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>24(25.5)</td>
<td>2(3.5)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>12(12.8)</td>
<td>17(30.4)</td>
<td></td>
</tr>
</tbody>
</table>
Cont... Table 1: Association of consanguineous marriage with socio-demographic and reproductive variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Low</th>
<th>21(37.5)</th>
<th>0.35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education of husband</td>
<td>Low</td>
<td>35(37.2)</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>22(23.4)</td>
<td>8(14.3)</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>37(39.4)</td>
<td>27(48.2)</td>
<td></td>
</tr>
<tr>
<td>Occupation of women</td>
<td>Housewife</td>
<td>85(90.4)</td>
<td>49(87.5)</td>
</tr>
<tr>
<td>Employed</td>
<td>9(9.6)</td>
<td>7(12.5)</td>
<td></td>
</tr>
<tr>
<td>Occupation of husband</td>
<td>Employed</td>
<td>26(27.6)</td>
<td>17(30.4)</td>
</tr>
<tr>
<td>Self employed</td>
<td>39(41.5)</td>
<td>26(46.4)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>21(22.3)</td>
<td>9(16.1)</td>
<td></td>
</tr>
<tr>
<td>Dead</td>
<td>8(8.5)</td>
<td>4(7.1)</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td>0-2</td>
<td>20(21.3)</td>
<td>17(30.4)</td>
</tr>
<tr>
<td>3-4</td>
<td>34(36.2)</td>
<td>16(28.5)</td>
<td></td>
</tr>
<tr>
<td>5+</td>
<td>40(42.5)</td>
<td>23(41.1)</td>
<td></td>
</tr>
<tr>
<td>Abortion</td>
<td>43(45.7)</td>
<td>20(35.7)</td>
<td>0.23</td>
</tr>
<tr>
<td>Child death</td>
<td>35(37.2)</td>
<td>16(28.6)</td>
<td>0.28</td>
</tr>
<tr>
<td>Having children with disabilities or genetic diseases</td>
<td>16(17.0)</td>
<td>6(10.7)</td>
<td>0.29</td>
</tr>
<tr>
<td>Total</td>
<td>94(100)</td>
<td>56(100)</td>
<td></td>
</tr>
</tbody>
</table>

Twenty two (14.7%) had at least one child with disability or genetic disease. The highest percent (16, 72.7%) of children with disability or genetic disease was among consanguineous marriages compare to 6 (27.3%) among the non-consanguineous marriages. Diseases associated with consanginuity as reported by women included epilepsy, congenital heart disease, diabetes mellitus, asthma, speech impairment, Down syndrome, hydrocephalus, thalassemia, psychological disturbance. About two third (97, 64.7%) had a positive attitude towards consanguineous marriage, however 37.3% of them knew that consanguineous marriage leads to genetic diseases, and 62.7% thought it does not lead to diseases. Twenty three congenital diseases and disabilities have been mentioned by 56 women. Thalassemia and congenital malformation were reported by 14 (25.0%) and 12 (21.4%) of respondents respectively. In table 2, the highest percent (116, 77.0%) of surveyed women preferred to recive information about the risk of consanguineous marriage before they got married. Family and relatives (66, 44.0%) were the main preferred source of information. Table 3 showed that the vast majority of the respondents (94.7%) realized the importance of having a medical examination before getting married, however only 72.0% of them had performed it.

Table 2: Perception of women about preferred time and source for receiving information regarding risks of consanguineous marriage.

<table>
<thead>
<tr>
<th>Preferred time for providing information regarding risks of consanguineous marriage:</th>
<th>Before marriage</th>
<th>116</th>
<th>77.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before first pregnancy</td>
<td>14</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>During pregnancy</td>
<td>2</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Any time</td>
<td>18</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>Preferred source for receiving this information:</td>
<td>Family doctors</td>
<td>26</td>
<td>17.3</td>
</tr>
</tbody>
</table>
**Table 2: Perception of women about preferred time and source for receiving information regarding risks of consanguineous marriage.**

<table>
<thead>
<tr>
<th>Source</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gynecologists</td>
<td>44</td>
<td>29.3</td>
</tr>
<tr>
<td>Family and relatives</td>
<td>66</td>
<td>44.0</td>
</tr>
<tr>
<td>Media and internet</td>
<td>13</td>
<td>8.7</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Do you support dissemination of information about the risk of consanguinity to the public:

- Yes 117 (78.0%)
- No 33 (22.0%)

Suggested sites for dissemination (n=117, 78.0%)

- Health centers 36 (30.8%)
- School Curriculum 28 (23.9%)
- Internet 24 (20.5%)
- TV 24 (20.5%)
- Families and relatives 5 (3.4%)

**Table 3: Perception of women about premarital examination, and their acceptance of consanguineous marriage in the future**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree about the importance of premarital examination</td>
<td>Yes</td>
<td>142</td>
<td>94.7</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8</td>
<td>5.3</td>
</tr>
<tr>
<td>Had a Premarital examination</td>
<td>Yes</td>
<td>108</td>
<td>72.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>42</td>
<td>28.0</td>
</tr>
<tr>
<td>Opinion if their sons prefer consanguineous marriage in the future</td>
<td>Strongly accept</td>
<td>90</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>Hesitate</td>
<td>33</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>Don’t agree</td>
<td>27</td>
<td>18.0</td>
</tr>
<tr>
<td>Reasons for accepting consanguineous marriage (n=98)</td>
<td>Knowing the personality of the mate before marriage</td>
<td>42</td>
<td>42.8</td>
</tr>
<tr>
<td></td>
<td>Strengthen family relations</td>
<td>25</td>
<td>25.5</td>
</tr>
<tr>
<td></td>
<td>Arranged marriage</td>
<td>25</td>
<td>25.5</td>
</tr>
<tr>
<td></td>
<td>Personal desire</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td></td>
<td>Avoiding problems within families</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Stay near relatives</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>Reasons for rejecting consanguineous marriage (n=52)</td>
<td>Avoid genetic disease</td>
<td>29</td>
<td>55.8</td>
</tr>
<tr>
<td></td>
<td>Avoid family problems</td>
<td>20</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td>Personal desire</td>
<td>3</td>
<td>5.8</td>
</tr>
</tbody>
</table>

**Discussion**

In this study, the overall frequency of inbreeding in Al-Ramadi city (Anbar province, Iraq) found to be 64.7% and the first cousin marriage was 38.6%. This rate is high when compare to findings of earlier studies in range of 47-60% \(^9,10\). This rate also was higher than the neighboring countries of Iraq such as Saudi Arabia (29.7%)\(^11\), Jordan (35.0%)\(^12\), Syria (35.4%)\(^13\), Iran (32.5%)\(^14\), Kuwait (54.3%)\(^15\), and Turkey (18.5%)\(^16\).
In Iraq, the tribal community, and traditional beliefs to keep strong family ties produced the positive attitude of parents towards consanguinity as showed by the high rates of inbreeding among them. Indeed, the past decade witnessed evidence of contradiction among the human groups living in semi-homogeneous societies, for example, the rate of consanguinity in Jordan and Saudi Arabia recorded a marked decline, however UAE and Qatar reported a significant increase in the rate of consanguinity. Results of present study found younger age at marriage was associated with consanguinity. Several studies from Pakistan, Oman, and Egypt confirmed the association of consanguinity with younger age at marriage. About 30% of highly educated husbands who preferred consanguineous marriages were self-employed, probably due to less chance for employment in our country even after graduation. Part of our findings showed that 64.7% of respondents support inbreeding, which is higher than that reported by Iran (38.8%). However, women who know that inbreeding lead to genetic disease were only 34.3% which indicated low awareness and less health education. Sandridge et al. (2010) reported that knowledge was imperfect with high proportions of participants not knowing that consanguinity has been implicated in autosomal recessive diseases and other genetic diseases. Majority of interviewed women (77.3%) recognized the danger of inbreeding and preferred receiving information about the risk of consanguinity before getting married. This finding was better than results provided earlier by Teeuw et al. (2012). Family and relatives were the most preferred sources for receiving such information in about 44.0% of women. Similarly was reported in Pakistan, but was lower than that reported in Oman. Medical examination before marriage was important in about 94.7% of respondents, however only 72% of them had perform it. Similar results were reported among sample of undergraduate students in Oman, the vast majority (92.0%) believed that premarital screening test is important and half of them favored to perform it as an obligatory procedure before marriage. Hamamy (2012) pointed out that wife’s parents preferred consanguineous marriage to keep them living close and to enjoy seeing their grandchildren. In our study about 60% of women accepted their offspring marrying within the family. This results were supported by study of Qidwai et al. (2003) in Pakistan. The main reasons in favor of consanguineous marriages were quoted as having more information about the mate before marriage (43%).

Conclusion

A very high rate (64.6%) of consanguineous marriage was reported among sample of married women in Al-Ramadi city, Anbar Province, Iraq. Two third of these marriages were first cousin marriage. Consanguinity has inverse association with women education. Genetic diseases and disability were reported more among consanguineous married group than non-consanguineous marriages. Although consanguinity is widely practiced and accepted, the awareness of women towards the health consequences to their offspring remain low. Most of the respondents preferred to receive information regarding the risks of consanguineous marriage before they are getting married. About 60% of women do not mind if their sons or daughters want to marry relatives in the future.

Declarations

Acknowledgement: We render our thanks to all medical staff working at Teaching Hospital of Maternity and Childhood in Al-Ramadi city for their time and unlimited support during the data collection process.

Funding: The author(s) received no financial support for the research, authorship, and/or publication of this article.

Availability of data and materials

Data will be available by emailing Drbth63@gmail.com

Ethics approval and consent to participate

We conducted the research following the Declaration
of Helsinki, and the protocol was approved by the Ethic Committee of the Scientific Issues and Postgraduate Studies Unit (PSU), College of Medicine, University of Anbar (Ref: SR/90 at 01-Mart 2018). Moreover, written informed consent and oral consent was obtained from each mother willing to participate after explanation of the study objectives and guarantee of secrecy.

**Competing Interest**: The authors declare that they have no competing interests

**References**

22. Teeuw ME, Hagelaar A, Ten Kate LP, Cornel MC, Henneman L. Challenges in the care for


Abstract

Tuberculosis (TB) is a contagious disease directly caused by tuberculosis (mycobacterium tuberculosis). The three countries with the highest incidence of 9.8 million cases of world TB are India (23%), Indonesia (10%) and China (10%) (WHO, 2014). The Government of Indonesia through the National Control Program of TB has made various efforts to tackle TB, with the strategy of Directly Observed Treatment Shortcourse (DOTS). In order to support DOTS strategy, to reduce the number of cases and understanding of PMO in doing supervision of taking medication in child tuberculosis patient, counseling done by pharmacist at PMO of child tuberculosis patient. Giving counseling and information to patients is very useful to improve patient knowledge. Knowledge is a predisposing factor that affects attitudes and behavior according to Green Theory. Subsequent behavior becomes one of the factors that play a role in influencing health status or healing based on H.L Theory. Blum. Nutritional status is a measure of a person’s body condition which can be seen from the Anthropometric Index and is the ratio of one measurement to one or more measurements or related to age and nutrient levels. This study aims to see the influence of counseling on the level of knowledge, attitudes and behavior of PMO Patient TB Children, as well as the nutritional status of TB children. This study uses 34 respondents who are PMO TB Patients Children, which is divided into 2 groups of 17 people given counseling and 17 people not given counseling. The result of the research shows the value of sig. <0.05 based on the Wilcoxon test test for the analysis of differences in effect on the level of knowledge, attitude and behavior before and after counseling. The conclusion of this study is that there are significant differences in influence on the level of knowledge, attitude and behavior before and after counseling. And there are significant differences in the nutritional status of children with TB before and after counseling.

Keywords: Tuberculosis, counseling, level of knowledge, attitude, behavior, nutritional status, PMO

Introduction

Tuberculosis (TB) is a contagious disease caused by tuberculosis (mycobacterium tuberculosis), transmitted through the air (droplet nuclei) when a patient with tuberculosis coughs and splashes of bacteria inhaled by others during breathing1. Given the importance of TB, in 1993 the World Health Organization (WHO) has launched a Global Emergency against TB disease. Data presented by WHO in Global Tuberculosis Report 2015 states that Indonesia occupies the second highest position in TB cases after India. The three countries with the highest incidence of 9.8 million cases of world TB are India at 23%, Indonesia at 10% and China at 10% of the total number of TB cases in the world2.

Data from the South Kalimantan Provincial Health Office in 2015 showed that the number of TB children infected in Banjar district was the highest compared to 12 other districts in South Kalimantan Province which was 1,175 cases of TB, of which 421 were new cases of BTA+ and 120 cases of child TB, an increase when compared to the number of cases in 2014 that only 888 cases of TB and 91 cases of child TB. The occurrence of an increase in the number of TB cases of children found in Banjar District are 91 cases in 2014 to 120 in 2015 is serious, as it is not in accordance with the target of decreasing incidence rate according to the National
TB Guideline of 2014 which should have a speed of shipment of 3-4%.

Counseling is part of the pharmaceutical service aspect. An important role of patient counseling is to improve the quality of life of patients and provide quality care for patients. Providing counseling and information to patients is helpful to improve adherence and prevent the failure of patient drug therapy.

The results of Rina et al (2012) showed that there was a significant difference in the knowledge about the adherence of patients receiving pulmonary tuberculosis before and after getting counseling, there were also significant differences in attitudinal attitude toward TB treatment before and after counseling. It can be concluded that the effect of counseling on knowledge, attitudes and compliance treatment of pulmonary tuberculosis patients in the work area of Samarinda Health Office. The same thing is also found in the results of research Kangagung, et al (2013) Obtained the results of significance value of 0.002 (p <0.05) on the evaluation of patient understanding which means the implementation of home care affects the patient’s understanding of pulmonary TB disease.

**Material and Method**

Design research or also called research design is set with the aim that research can be done effectively and efficiently. This type of research is quantitative using quasi experiment method with Pretest and Posttest Control Group Design. In this research design the sample is divided into 2 groups (given counseling and which not given counseling). Then each sample will be observed data by way of Pretest and Posttest.

### Findings

**Table 1 Result of univariate analysis**

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>% Pre</th>
<th>% Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Knowledge of drug taking supervisor (PMO) Child TB patient in group given counseling</td>
<td>Good</td>
<td>4</td>
<td>23.53</td>
<td>70.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enough</td>
<td>10</td>
<td>58.82</td>
<td>29.41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less</td>
<td>3</td>
<td>17.56</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>Knowledge of PMO TB child sufferers in groups not given counseling</td>
<td>Good</td>
<td>5</td>
<td>29.4</td>
<td>35.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enough</td>
<td>9</td>
<td>52.9</td>
<td>47.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less</td>
<td>3</td>
<td>17.6</td>
<td>17.6</td>
</tr>
<tr>
<td>3.</td>
<td>Attitudes of PMO TB patients in the group given counseling</td>
<td>Good</td>
<td>3</td>
<td>17.6</td>
<td>64.7</td>
</tr>
</tbody>
</table>

Based on Table 1 of 17 PMO before being given counseling (pretest) most have enough knowledge is 10 people (58.82%), followed by PMO with good knowledge is 4 person (23.53%) and knowledge less is 3 person (17.65%). After being given counseling (Posttest), most of PMO knowledge is good that is 12 people (70.5%), followed by PMO with enough knowledge about 5 people (29.41%). PMO that is not given counseling on pretest most is PMO which have enough knowledge is 5 people (29.4%) and knowledge less that 3 person (17.6%). After the most posttest is PMO with enough knowledge that is 8 people (47.1%), followed by good knowledge that is 6 people (35.3%) and less knowledge that is 3 person (17.6%). PMO before getting counseling can be seen less attitude is 5 people (29.4%) and PMO which have good attitude is 3 person (17.6%). After being given counseling (Posttest) PMO attitudes are good that is 11 people (64.7%), followed by PMO with enough attitude as many as 6 people (35.3%). PMO that is not given counseling on pretest most is PMO which have good enough attitude that is 8 people (47.1%), followed by PMO with less attitude that is 5 people (29.4%) and good attitude that is 4 person (23%, 5%). After the most posttest is PMO with good attitude and enough that is 6 people (35.3%), followed by PMO with less attitude that is 5 people (29.4%).

The behavior of POM who received counseling before giving counseling (pretest) mostly had enough
behavior was 9 people (52.9%), followed by PMO with good behavior was 7 people (41.2%) and less behavior was 1 person (5.9%). After being given counseling (Posttest) PMO behavior is good that is 12 people (70.6%), followed by PMO with enough behavior as much as 5 people (29.4%). PMO that was not given counseling on pretest, most have enough behavior is 8 people (47.1%), followed by good behavioral behavior is 5 people (29.4%) and behavior is less 4 people (23.5%). In Posttest, most of PMO behavior is enough that is 9 people (52.9%), followed by PMO with good behavior that is 6 people (35.3%) and behavior less as much as 2 person (11.8%).

Table 2. Bivariate Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Test of Normality (sig.)</th>
<th>Mean Rank</th>
<th>Test crucified wallis (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Counseling</td>
<td>0.000</td>
<td>21.44</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>No counseling</td>
<td></td>
<td>13.56</td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>Counseling</td>
<td>0.000</td>
<td>20.88</td>
<td>0.030</td>
</tr>
<tr>
<td></td>
<td>No counseling</td>
<td></td>
<td>14.12</td>
<td></td>
</tr>
<tr>
<td>Behavior</td>
<td>Counseling</td>
<td>0.000</td>
<td>21.24</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>No counseling</td>
<td></td>
<td>13.76</td>
<td></td>
</tr>
<tr>
<td>Nutritional status</td>
<td>Counseling</td>
<td>0.000</td>
<td>16.06</td>
<td>0.086</td>
</tr>
<tr>
<td></td>
<td>No counseling</td>
<td></td>
<td>18.94</td>
<td></td>
</tr>
</tbody>
</table>

Based on the table 2 the results of the average study of differences in the influence of knowledge, attitudes and behavior of PMO TB Patients in the group of counseling is greater than the group not given counseling, namely knowledge (21.44> 13.56), attitude (20.88> 14.12), behavior (21.24> 13.76) and (16.06> 18.94). The result of crucified wallis test to see the difference of influence of knowledge, attitude, and behavior of PMO of TB Child Patient is found that p-value value is 0.010 for knowledge, 0.030 for attitude, 0.013 for behavior, 0.086 for nutrient status. From p-value value in statistical test results Ho decision was rejected (p <0.05), indicating that there is influence giving counseling to knowledge, attitude, behavior of PMO and nutritional status of TB Child Patients.

**Discussion**

The influence of counseling on Knowledge of PMO was analyzed using crucified wallis test with sig result. 0.024 or Ho is rejected which means significant influence counseling to the knowledge of PMO patient TB child. The result of pretest and posttest in the control group that is not given counseling, that is the number of PMO with sufficient knowledge has decreased and the number of PMO with less knowledge does not change, but the increase and decrease the number of PMO is not significant. While the results of pretest and posttest in the group given counseling, the number of PMO with good knowledge has increased significantly, the number of PMO with sufficient knowledge decreased significantly and the number of PMO with less knowledge also decreased significantly. It shows that counseling has a significant effect on the knowledge of PMO of children with TB. Drug counseling is one of the methods of facial education, is one form of pharmaceutical services in an effort to improve the knowledge and understanding of patients in the use of drugs. In counseling, PMO is given an explanation of TB disease, so that the PMO given the exact counseling will have better knowledge than the PMO that is not given counseling\(^9\).

The results of this study are in line with research conducted by Loriana et al. (2013) indicating that there is a significant effect of counseling on the knowledge of TB suffers in the work area of the Samarinda Health Office\(^6\).
The influence of counseling on the attitude of PMO is analyzed using the Kruskal Wallis test with $p < 0.030$ or Ho rejected which means there is influence of counseling to PMO attitude of TB child patient. The result of pretest and posttest in the control group that is not given counseling, that is the number of PMO with good attitude has increased, the number of PMO with sufficient decreasing attitude and the number of PMO with less attitude not change, but the increase and decreasing the number of PMO is not significant. While the pretest and posttest results in the group given counseling, the number of PMO with good attitude has increased significantly, the number of PMO with sufficient attitude decreased significantly and the number of PMO with less attitude also decreased significantly. This indicates that counseling has a significant effect on the attitude of PMO TB Patients.

Several studies have also shown similar results, one of which was Loriana et al. (2013) indicating that there is a significant effect of counseling on the attitude of TB sufferers in the work area of Samarinda Health Office.

The influence of counseling on the behavior of PMO is analyzed using Kruskal Wallis Test with $p < 0.029$ or Ho rejected which means there is influence of counseling on the behavior of PMO of child TB patient. The results of pretest and posttest in the control group that were not given counseling, are the number of PMO with good behavior has increased, the number of PMO with behavior is quite increased and the number of PMO with less behavior decreased, but the increase and decrease in the number of PMO is not significant. While the pretest and posttest results in the group given counseling, the number of PMO with good behavior has increased significantly, the number of PMO with behavior quite decreased significantly and the number of PMO with less behavior also decreased significantly. This indicates that counseling has a significant effect on the behavior of PMO of children with TB. The results obtained in accordance with research conducted by Loriana et al (2013) and Nurhamidah (2015) which explains that there is a relationship providing counseling to drug taking behavior in patients with TB. The study by Wu et al (2011) explains that there is a positive relationship between attitude and behavior ($p < 0.001$).

Ministry of Health Republic of Indonesia (2016) stated that nutritional status in children with TB will affect the success of TB treatment. Nutrition status is a measure of success in the fulfillment of nutrition for children indicated by body mass index (BMI) of children. To get IMT each child tuberculosis patient is measured body weight and height of patient at the beginning and end of treatment. The results of BMI measurements on 34 children with TB of children showed that there was an increase in nutritional status after receiving TB treatment. In the counseling group, children with tuberculosis patients who had very thin nutritional status at the start of treatment were 4 (23.53%) and decreased to none (0%) of TB patients with very thin nutritional status after TB treatment. Patients with tuberculosis who had nutritional status were thin at the beginning of TB treatment as many as 6 people (35.29%) and decreased to none (0%) of tuberculosis children who have very thin nutritional status after undergoing TB treatment. Furthermore, children with TB who had normal nutritional status at the beginning of treatment were 7 people (41.18%) who then increased to 16 people (94.12%) after receiving TB treatment. And children with TB TB at the beginning of treatment (0%) who had fat nutritional status increased to 1 person (5.88%) after receiving TB treatment. Counseling on PMOs leads to increased knowledge, attitudes and behavior of PMOs that have an impact on improving adherence to TB treatment for tuberculosis patients, adherence to treatment has an impact on the success of TB therapy as indicated by improving the nutritional status of TB children.

**Conclusion**

There is a difference of influence on the level of knowledge of the drug controller (PMO) of child TB patients before and after counseling.

There is a difference of influence on the attitude of drug taking supervisor (PMO) of TB patients before and after not given counseling. There is a difference of influence on the behavior of drug control watchdog (PMO) of TB patients before and after counseling.

There are differences in counseling effect on the nutritional status of TB patients before and after counseling.

There is influence of counseling to the level of knowledge, attitude, behavior of PMO and nutritional status of child TB patient.

**Ethical Clearance:** This study approved and
received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for ethical clearance and informed consent. The informed consent included the research title, purpose, participants’s right, confidentiality and signature.

Source Funding: This study done by self funding from the authors.

Conflict of Interest: The authors declare that they have no conflict interest.

References

Assessment of Nurse’s Awareness about Autism Spectrum Disorder in Pediatric Wards at Kirkuk Public Hospitals

Idrees Hasan Mohammed*, Bahar Nasradeen Majeed*
*College of Nursing/Sulaimani University, Iraq

Abstract

The study Objective is To assess Nurse’s Awareness about Autism Spectrum Disorder in pediatric wards at Kirkuk Public Hospitals, To describe the socio-demographic characteristics of nurses who work in pediatric wards, To assess the nurses awareness level about information, concepts and facts about autism spectrum disorder, To find out the relationship between Nurses awareness level about Autism Spectrum Disorder and some related variables such as (age, gender, number of autistic child that he or she provides care for them). Quantitative design descriptive study was used to assess of nurses awareness who work in pediatric ward about Autism Spectrum Disorder at Public Hospitals in Kirkuk city, from Jun 20 to 10 September 2016. The findings in general indicated that nurses level of awareness in all items related to all three domains (information, concepts and facts about autism spectrum disorders), (social interaction and communication in children with autism) and (disorder in behavioral patterns) were in poor level and recorded low total mean of scores (16.5 ± 3.6), (16.7 ± 3.8), and (16.4 ± 4.0) respectively. The findings of the study researcher recommend to construct an educational program about this important issue to enhance nurses level of awareness and information.

Keywords: Assessment, Autism, Kirkuk Public Hospitals

Introduction

Autism spectrum disorder was first described in 1943 by the American child psychologist, Leo Kanner. He presented 11 children whose behaviors’ were obviously different from those of others. Kanner suspected that they had an inborn feature which had prevented their regular social contacts. Autism terms from the Greek word “auto” means “alone” officially presented by Kanner’s 1943. Clinical name, autism or autism spectrum disorders (ASD), is a complex disorder involves abnormal nervous system development. Autism is a disorder of neural development, characterized by impaired social interaction and communication, with restricted repetitive behaviors. Onsets of this condition at birth or within the first two and a half years of life. Although behavioral differences in children and become more clear before age 2 years in most of them, usually diagnosed in 3 years old or more. Even though the etiology and pathogenesis of ASD is not fully recognized and fully clarified, various genetic, prenatal, early postnatal, microbiological, biochemical and environmental factors have been implicated in the etiopathogenesis of autism. Autism can present in all races, social status, religions and classes of people. It can occur in any child and family, so far the main causes of this disorder unknown that is why there is no medical cure completely. The number of children with ASDs have increased during the past decade, and prevalence of autism had risen dramatically, based on (Centers for Disease Control, and Prevention) CDC estimates from 2012 autism is seen in 1 of every 88 children. Recently, diagnosis of autism has been more frequently made. Early diagnosis is quiet important with respect to rehabilitation alternatives, and long term responses, nurses awareness and knowledge about Autism spectrum disorders utmost important to identify the early diagnosis of children with ADS.
Methodology

Setting of Study

The study was carried out in pediatric ward of three public hospitals in Kirkuk city (Pediatric Hospital, Azadi Teaching Hospital and Kirkuk General Hospital).

Sample of the Study

An non-probability/Convenience sampling technique was applied in the present study. All nurses who work in pediatric wards in Public hospitals of Kirkuk city were involved. Two hundred nurses were constituted the study sample that they were recruited from (Azadi Teaching Hospital 47 nurses, Kirkuk General Hospital 33 nurses, Pediatric Hospital 120 nurses).

Inclusion Criteria

Nurses who have interest and agree to be involved in the study.

Nurses who work in pediatric ward.

Both genders (male and female).

Exclusion Criteria

- Nurses who do not participate in the study

Tools of Data Collection:

In order to collect the proper information of study, the questionnaire was designed and constructed by the researcher to measure the variables underlying the present study.

Results and Discussion

Table (1) demonstrates that majority of the sample are females (57.5%). While the rest were male and represent (42.5%). This finding reflects that female are more interested in work as a nurse because all activities and interventions are part of their nature of life and have positive impact on them. According to age groups, the greatest percentages of the sample present among (30-39), (20-29) years old which accounts (38.5%),(37.5%) respectively, with Mean and SD (33.2,±1.71). The smallest proportions of the sample (4.5%) their age ranged between (50-69) years old, and most of them (66%) were married. In the same table the finding reveals that the study sample of nurses who work in pediatric wards in Kirkuk city, more than half of the sample (60%) were from pediatric hospital, this indicated that this hospital is a special hospital for children that is why the highest percentage of nurses were present in this hospital, While (23.5%) of the sample were from Azadi Teaching hospital, and the rest which account (16.5%) were from Kirkuk General hospital.

Table (2) reveals level of awareness of nurses who work at pediatric wards regarding Information, Concepts and Facts about Autism Spectrum Disorders. It shows that the mean of scores was poor level in all items related to domain one which includes 10 items that ranged between (1.56-1.75) M.S with total M.S (16.5 ± 3.6). This indicated that nurses awareness regarding Information, Concepts in Autism Spectrum Disorders were insufficient and very poor. Item number (10) which states Autism could be associated with Mental Retardation or Epilepsy, has got the highest mean of scores (1.75) and it was in the first order of the rank, followed by item number (1) the second order of the rank which has got the mean of scores (1.74), Item number (3 and 4) becomes third and forth order of the rank which got (1.72) and (1.71) mean of scores respectively. While item number (2) come in the fifth order of the rank and it got the mean of scores (1.69) which states that Autism spectrum disorders is unknown causes. It is worth to mention that item number (6) recorded the lowest mean of scores (1.56), which states signs of Autism show between 1-3, years, followed by items number (5,7,8) which accounts (1.58) means of scores for each one of them. In addition, to item number (10) has got highest percentage of respondents (62.5%) they do not know the (co-morbidity of Autism could be associated with Mental Retardation or Epilepsy), followed by item number (1) they do not know the meaning of Autism it is a neuro-developmental disorders characterized by impaired social interaction, verbal and non-verbal communication, and restricted and repetitive behavior (60%) of respondent, it is worth to mention that unfortunately very few percentages of sample were aware or have knowledge about all items that include domain one in general with ranged between (5.5% -7.5%). Results of our present study disagree with result study done by (7) “Knowledge of childhood autism and challenges of management among medical doctors in Nigeria” who indicate that only (31.1%) of respondent do not know the (co-morbidity of Autism could be associated with Mental Retardation or Epilepsy), while in our finding (62.5%) of respondents do not know (co-
morbidity of Autism could be associated with Mental Retardation or Epilepsy). A study has done by (8) aimed to assess the level of awareness about childhood autism among first grade nursing and medical student in Istanbul, Turkey, mentioned that (40.6%) of respondent do not know the definition of the Autism Spectrum Disorders is a neurodevelopmental disorders characterized by impaired social interaction, verbal and non-verbal communication, and restricted and repetitive behavior, which disagrees with our finding that (60%) of our respondents were aware that the correct age of the appeared of autism signs and symptoms is between 1-3 years. Table (3) explains the total mean scores for each domain separately and mean of scores for all three domains. In all total three domains mean of scores does not reach (17) that is why level of awareness in each domain was poor which accounts (16.5, 16.7, 164) in all three domain respectively. Total mean of scores in all three domains together accounts (49.7) which indicates to calculating means of scores for each domain separately and in all three domain together in chapter three Methodology page (63-64). This finding in present study indicated that nurses who participated in this study did not get any information about ASD, while they were nurses students and after their graduating or during their services as a nurse in all three hospitals. This is what the researcher look for and should be highlighted especially for nurses who work in pediatric ward, it is very important to be aware about this disorder. Table (4) demonstrates the relationship between nurses level of awareness in all three domains regarding ASD and age groups. The finding in this table shows that there is no significant relationship between nurses level of awareness and their age groups in all three domains (P. value 0.05). The results in the present study agree with the results of previous study done by (10) which mentioned that there is no significant relationship between nurses level of awareness and age groups, but it’s worth to mention that our finding disagrees with the study curried out by (11) who said that their is a significant relationship between nurses level of awareness and age groups. Table (5) explores the relationship between nurses level of awareness in all three domains regarding ASD and Gender, as it show above there is no significant relation between nurses gender whom work at pediatric ward and level of awareness all three domains (p. value 0.05). The table (6) demonstrate the relationship between nurses level of awareness in all three domains regarding ASD and nurses who caring to ASD child. The finding shows that there is highly significant relationship between nurses level of awareness and nurses who caring their to ASD child previously at (p.value 0.05), this result is supported by the result of previous study done by (7) mentioned that their is a significant relationship between knowledge of respondents about child hood autism and their management to ASD Child, also our present study results agree with the results of previous study done by (Igwe, et al., 2011) who found significant relationship between nurses knowledge about child hood autism and caring to ASD child previously. more contact with ASD child due to more experience and awareness.

Table (1) Distribution of the Sample According to Socio-Demographic Characteristics.

<table>
<thead>
<tr>
<th>Socio-Demographics Characteristics</th>
<th>Frequency</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>85</td>
<td>42.5 %</td>
</tr>
<tr>
<td>Female</td>
<td>115</td>
<td>57.5 %</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100 %</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29 Years</td>
<td>75</td>
<td>37.5 %</td>
</tr>
<tr>
<td>30-39 Years</td>
<td>77</td>
<td>38.5 %</td>
</tr>
<tr>
<td>40-50 Years</td>
<td>39</td>
<td>19.5 %</td>
</tr>
<tr>
<td>50-69 Years</td>
<td>9</td>
<td>4.5 %</td>
</tr>
<tr>
<td>Mean = 33.28</td>
<td></td>
<td>SD = ± 1.71</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>59</td>
<td>29.5 %</td>
</tr>
<tr>
<td>Married</td>
<td>132</td>
<td>66%</td>
</tr>
<tr>
<td>Divorce</td>
<td>6</td>
<td>3 %</td>
</tr>
<tr>
<td>Widow</td>
<td>3</td>
<td>1.5 %</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100 %</td>
</tr>
<tr>
<td>Place of working</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azadi Teaching Hospital</td>
<td>47</td>
<td>23.5 %</td>
</tr>
<tr>
<td>Kirkuk General Hospital</td>
<td>33</td>
<td>16.5 %</td>
</tr>
<tr>
<td>Pediatric Hospital</td>
<td>120</td>
<td>60 %</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100 %</td>
</tr>
</tbody>
</table>
### Table (2) Distribution of the Sample according to Nurses level of Awareness in terms (Information, Concepts and Facts about Autism Spectrum Disorders)/Domain One

<table>
<thead>
<tr>
<th>N</th>
<th>Items</th>
<th>Yes</th>
<th>Don’t Know</th>
<th>No</th>
<th>Mean</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>Autism is a neurodevelopmental disorders characterized by impaired social interaction, verbal and non-verbal communication, and restricted and repetitive behavior</td>
<td>14</td>
<td>7</td>
<td>120</td>
<td>60</td>
<td>66</td>
</tr>
<tr>
<td>2-</td>
<td>Autism spectrum disorders is unknown causes</td>
<td>15</td>
<td>7.5</td>
<td>105</td>
<td>53.5</td>
<td>80</td>
</tr>
<tr>
<td>3-</td>
<td>Four to five times more common in males than females</td>
<td>12</td>
<td>6</td>
<td>119</td>
<td>59.5</td>
<td>69</td>
</tr>
<tr>
<td>4-</td>
<td>Teaches autistic child in special education classes</td>
<td>13</td>
<td>6.5</td>
<td>115</td>
<td>57.5</td>
<td>72</td>
</tr>
<tr>
<td>5-</td>
<td>Autism is not treatable using medication alone</td>
<td>14</td>
<td>7</td>
<td>88</td>
<td>44</td>
<td>98</td>
</tr>
<tr>
<td>6-</td>
<td>Signs of Autism show between 1- 3 years</td>
<td>11</td>
<td>5.5</td>
<td>89</td>
<td>44.5</td>
<td>100</td>
</tr>
<tr>
<td>7-</td>
<td>Autism is defined as a Childhood Schizophrenia</td>
<td>15</td>
<td>7.5</td>
<td>86</td>
<td>43</td>
<td>99</td>
</tr>
<tr>
<td>8-</td>
<td>Autism could be associated with Attention Deficit Hyperactivity Disorder (ADHD)</td>
<td>14</td>
<td>7</td>
<td>87</td>
<td>43.5</td>
<td>99</td>
</tr>
<tr>
<td>9-</td>
<td>Autism is hereditary causes</td>
<td>12</td>
<td>6</td>
<td>99</td>
<td>49.5</td>
<td>89</td>
</tr>
<tr>
<td>10-</td>
<td>Autism could be associated with Mental Retardation or Epilepsy</td>
<td>12</td>
<td>6</td>
<td>125</td>
<td>62.5</td>
<td>63</td>
</tr>
</tbody>
</table>

Total Mean & S.D: 16.5 ± 3.6

### Table (3) Disturbance of Sample according to total mean scores Patterns in all Three Domains regarding Nurses level of Awareness.

<table>
<thead>
<tr>
<th>Domain possible score</th>
<th>Number of Items</th>
<th>Mean ± SD</th>
<th>Awareness Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain 1 (10-30)</td>
<td>10</td>
<td>16.5 ± 3.6</td>
<td>Poor</td>
</tr>
<tr>
<td>Domain 2(10-30)</td>
<td>10</td>
<td>16.7 ± 3.8</td>
<td>Poor</td>
</tr>
<tr>
<td>Domain 3(10-30)</td>
<td>10</td>
<td>16.4 ± 4.0</td>
<td>Poor</td>
</tr>
<tr>
<td>Total mean score (30-90)</td>
<td>30</td>
<td>49.7 ± 10.38</td>
<td>Poor</td>
</tr>
</tbody>
</table>

### Table (4) Distribution of Sample according to Relationship between Nurses Awareness level and Age Group.

<table>
<thead>
<tr>
<th>Age Group Domains</th>
<th>F</th>
<th>p. Value</th>
<th>Sig. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Domain 1</td>
<td>1.12</td>
<td>.340</td>
<td>N.S</td>
</tr>
<tr>
<td>Total Domain 2</td>
<td>.62</td>
<td>.600</td>
<td>N.S</td>
</tr>
<tr>
<td>Total Domain 3</td>
<td>.32</td>
<td>.810</td>
<td>N.S</td>
</tr>
</tbody>
</table>
Table (5) Distribution of Sample according to Relationship between Nurses Awareness level and Gender.

<table>
<thead>
<tr>
<th>Domains</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>S.D</th>
<th>t</th>
<th>p. value</th>
<th>Sig. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total domain 1</td>
<td>Male</td>
<td>85</td>
<td>16.71</td>
<td>3.46</td>
<td>.613</td>
<td>.966</td>
<td>N.S</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>115</td>
<td>16.38</td>
<td>3.84</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total domain 2</td>
<td>Male</td>
<td>85</td>
<td>16.58</td>
<td>4.04</td>
<td>.418</td>
<td>.483</td>
<td>N.S</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>115</td>
<td>16.81</td>
<td>3.76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total domain 3</td>
<td>Male</td>
<td>85</td>
<td>16.08</td>
<td>3.94</td>
<td>1.191</td>
<td>.239</td>
<td>N.S</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>115</td>
<td>16.77</td>
<td>4.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (6) Distribution of Sample according to Relationship between Nurses Awareness level and Nurses who Caring to ASD Child .

<table>
<thead>
<tr>
<th>Care to ASD Child Domains</th>
<th>F</th>
<th>p. value</th>
<th>Sig. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total domain 1</td>
<td>23.00</td>
<td>.000</td>
<td>H.S</td>
</tr>
<tr>
<td>Total domain 2</td>
<td>12.70</td>
<td>.000</td>
<td>H.S</td>
</tr>
<tr>
<td>Total domain 3</td>
<td>21.61</td>
<td>.000</td>
<td>H.S</td>
</tr>
</tbody>
</table>

**Conclusion**

Majority of the sample are female, most of them there age ranged between (30-39, and 20-29) years old. Nurses awareness level in general regarding ASD in all three domains (information, concepts and facts about autism spectrum disorders), (social interaction and communication in children with autism), and (disorder in behavioral patterns) was insufficient and very poor. No significant relationship were found between nurses level of awareness and age groups, gender. Significant relationship were found between nurse’s level of awareness and nurses that caring to autistic child. Construct an education program to enhance nurses information, this will also improving their clinical ability to early recognize children with symptoms of Autism Spectrum Disorders in this environment.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the COLLEGE OF NURSING/SULAIMANI UNIVERSITY, IRAQ and all experiments were carried out in accordance with approved guidelines.

**References**


Assessment of Nurses’ Knowledge and Practices Regarding Nasogastric Tube at Neonatal Intensive Care Unit in Baghdad Hospitals

Asmahan Qasim Mohammed

Pediatric Nursing Unit, College of Nursing/ University of Baghdad, Iraq

Abstract

A descriptive study was carried out in Baghdad City from 16th of Nov 2017 to 1st of May 2018. A non-probability sample of (35) Nurses working at neonatal Intensive care unit at the Children Welfare Teaching Hospital, Child’s Central Teaching Hospital and Ibn -Albadly Hospital. The study instrument consisted of three major parts to meet the purposes of the study. The first part is related to nurses socio-demographic data, the second part is related to nurses knowledge about nasogastric tube, it consisted of three domains (20) items and the third part is observation checklist related to nurses practices about NG tube, it consist of (14) items. The validity of the instrument’s contents was established through a panel of (10) in different specialties related to the field of the present study. The study was collected by using a constructed questionnaire through an application of direct interview and observation checklist. The data were analysed by using two statistical approaches: Descriptive, Inferential statistics. The study revealed that the nurses knowledge about NG tube was 54.3% (Poor), followed by those who have 37.1% (fair) knowledge.

Keywords: Nurses, Knowledge, Practises, Nasogastric tube.

Introduction

Feeding tube is a safe means of meeting the nutritional requirements of infants who are unable to feed orally. These infants are usually too weak to suck effectively, are unable to coordinate swallowing, and lack a gag reflex. Feeding tube may be provided by continuous drip regulated via infusion pump or by intermittent bolus feedings. Studies have demonstrated an overall decrease in total milk fat concentration delivery when continuous gavage infusions are administered, which suggests that intermittent or bolus gavage of expressed mother’s milk be administered when possible. Although the more relaxed lower esophageal sphincter makes passage of the tube easier, there may be changes in heart rate and Blood Pressure in response to vagal stimulation. Complications of indwelling tubes include aspiration, obstructed nares, mucous plugs, purulent rhinitis, epistaxis, infection, and possible stomach perforation. Current practice dictates a radiograph as the only certain way to determine nasogastric (NG) tube placement. Methods such as auscultation of an air bubble, and neckear-xiphoid (NEX) measurements for insertion depth, and pH measurements are considered imprecise when used as the only method for determination of placement. Nurses in the NICU should be alert about tube size selection, assessment of tube position, methods of securing tube or method of feeding, providing correct patients position, checking the patency of tube, checking the food content (liquid foods are used), assessing the bowel sounds, which are important components to minimize the risks of NG tube related complications and to provide optimal patient safety and comfort. Major attention must be focused on nurse’s knowledge and performance regarding nasogastric tube because nurses have the major responsibility for providing patients with their essential nutrients without causing complications. As well as continuous education and training of all hospital staff is essential to increase their knowledge.
about important nursing procedures as nasogastric tube. Critical care nurses are playing a major role in preparing, monitoring, administrating and evaluating the patient response to medication and nutritional care. Also nurses’ knowledge and practices about feeding or administration of medications via NGT may differ from hospital to another and need to be assessed and observed to find if there is a gap between their knowledge and practice and if they follow the standard guidelines to administer medication via NGT so this study is designed to assess the nurses’ knowledge and practice about NGT at NICU in Baghdad hospitals.

Methodology

A descriptive study was carried throughout the current study for the period from 16th of Nov 2017 to 1st of May 2018. In order to assess Nurses’ knowledge and practices regarding nasogastric tube at neonatal intensive care unit in Baghdad City and administrative arrangement was taken. The approval of the nursing college council upon the title and objectives of the study. Afterward, many approvals were obtained from different directorates which have an administrative relation with this study. Approvals of the ministry of Health, Al Karkh Health Directorate / Baghdad AL – Russafa health directorate , Medical City Directorate and the directorate of selected hospitals in Baghdad City. The present study was conducted in Baghdad City; neonatal intensive care unit at the Children Welfare Teaching Hospital, Child’s Central Teaching Hospital and Ibn –Albaldy Hospital. A purposes (non-probability) sample of (35 ) nurses working at neonatal Intensive care unit in Baghdad Hospital. These were assigned for study according to the following special criteria: nurses working at Intensive care unit in Hospitals selection, nurses who agreed to participate in this study, nurses from various educational level, both sexes(male and female), nurses from various age group, morning shifts only. a questionnaire format was designed and constructed by the researcher depending on: the extensive review of available, related literatures and studies about nasogastric tube. The questionnaire consists of three parts, Part I: The demographic information includes data related to nurses’ characteristics such as ( age, gender, educational level, years of experience in hospitals, years of experience at neonatal intensive care unit). Part II: The questions in part II are related to nurses knowledge about nasogastric tube at neonatal intensive care unit. It consisted of (3 ) domains. First domain had (4 ) items, second domain had (10) items , and third domain had (6) items . The questions was rated on a three likert scale (know, uncertain, and do not know) and was scored as 1 for know, 2 for uncertain, and 3 for don’t know. Part III : The questions in part III are related to nurses practice about nasogastric tube at neonatal intensive care unit. An observational checklist was developed by researcher depend on previous studies and literature review. It consisted of (14) items. The data collected with constructed questionnaire through an application of direct interview and using checklists as mean of data collection from 30th of January 2018 to 15th of February 2018. Data were analyzed through the application of two different statistical approaches Descriptive statistics: frequency, percentages and means. Inferential statistics: significance, and Chi-square.

Results and Discussion

Socio-Demographic Characteristics of the Nurses, who participate in the study, in the Neonatal Intensive Care Unit (Table1) Age of Nurses; finding of the present study revealed that the age mean is 32.8 ± 7.0; more than a half are within the age group of (23-30). This result agrees with study done by Raju,et al.,(2011) he provided in their study that the age (21-30 years) were 86% of the study sample. Also agree with study done by Kaur, et al.,(2008) was observed that most years old of the sample age at group (20-30). Gender of Nurses: The present results reveal that 68.6 % of the sample are female. This finding of the present study supportive evidence is available in the study done by Kamunge,(2013) found that 70.2% of the sample of his female, also agree with the study done by Saleh, et al.,(2009) discovered that females in the study was 94.6% and was the highest percentage. The passion and the females familiar feeling this was the reason for the high percentage of the female in the present study, also she was able to deal with their sense of motherhood newborn making them successful at work in the neonatal intensive care unit. This is the belief researchers. Nurses’ Level of Education; the present study findings that the majority of the sample graduated from the associate degree diploma 62.9% , followed by those who are nursing high school graduates 25.7%, and those who hold a bachelor’s degree 11.4% . This result disagrees with study done by Hassan and Hassan, (2012) who showed in the study that the graduated from a secondary school of nursing were 42.5% of her study samples but agrees with Asadullah, et al., (2013) who stated that the
68.7% of the study sample where diploma percentage holders in nursing. Years of Experience in Nursing; finding of the present study revealed that the highest percentage 45.7% have (1-5) years of experience in nursing of the study sample. The result of this study disagree with results of study conducted by Barton (2001) which indicated that highest percentage 80% have (6-10) years of experience in nursing. Years of experience in NICU; the present study revealed that the highest percentage 65.7% have (1-5) years of experience in NICU compared to those who have (6-10) years. This result disagrees with Maheswari and Muthamilseliv, (2014) who discovered that the years of employment was 64% of the study sample, and had experience of (6) years and above. But agree with study done by Chau, et al., (2010) point out that the 45% was a high percentage of the sample years of experience had (1-5) years of working experience. Participation in Training Course; most of the study sample have training course about nasogastic tube , which represents 62.9 % of the sample study. all these courses were held inside Iraq (100.0%). This result agrees with Asadullal, et al.,(2013) who showed that the previous training course was 73.5% of the study sample. Also this study agree with the study done by Olivera, et al., (2009) he pointed out that 52% of the study sample had training courses. Getting Information about nasogastic tube; the results of the study declared that 68.6 % of nurses got information about NG tube and most of those who reported that they read such resources page the internet to get such information70.8% compared to books 29.2%. The results of this study disagree with results obtained from a study conducted by Al–Ibady (2011) who demonstrated that nurses who don’t get information from any resource comprised a high percentage 52.5%. The current study showed that the more than a half of participants have 54.3% poor knowledge followed by those who have 37.1% fair knowledge, and those who have 8.6% good knowledge(Figure 1). This study agree with Ahamed and Mondal (2014) who illustrated that three-quarters of studied nurses had inadequate knowledge regarding Ryle’s tube feeding. The present study showed that the most of participants have 77.1% fair practices , followed by those who have 22.9% good practices(Figure 2). This study disagree with Ahamed and Mondal (2014) who illustrated that most of the studied nurses had a satisfactory level of practiced skill regarding care given before NG tube feeding administering. Regarding age of the participants, Nurses who are within the age group of (31-38) years-old have better knowledge about NG tube than those who are in the age group of (23-30), and those who are in the age group of (39-48). However, there is no statistically significant difference in participants’ knowledge among age groups, as seen in (Table 2). Regarding academic qualification, nurses who hold a bachelor’s degree have a better knowledge about NG tube than those who are nursing high school graduates, and those who hold an associate degree. However, there is no statistically significant difference in participants’ knowledge among educational qualification groups as seen in (Table3). These results disagreed with results obtained by Al –Gannem (2006) whom indicated no significant associations between nurses’ knowledge and their level of education Regarding years of experience in NICU, Participants who have (6-10) years of experience in NICU have better knowledge about NG tube than those who have (1-5) years of such experience. However, there is no statistically significant difference in participants’ knowledge between years of experience in NICU groups, as seen in (Table 4). This result disagrees with Al-Jaza’iri,(2007) who presented that the years of experience in specialist areas where the nurses’ work would increase their knowledge.

### Table 1: Socio-demographic Characteristics of the Study Sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age:</strong> Mean (SD) = 32.8 ± 7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23-30</td>
<td>19</td>
<td>54.3</td>
</tr>
<tr>
<td>31-38</td>
<td>10</td>
<td>28.6</td>
</tr>
<tr>
<td>39-48</td>
<td>6</td>
<td>17.1</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>31.4</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
<td>68.6</td>
</tr>
</tbody>
</table>
### Table 1: Socio-demographic Characteristics of the Study Sample

<table>
<thead>
<tr>
<th>Educational Qualification</th>
<th>N</th>
<th>Mean Rank</th>
<th>9</th>
<th>25.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing high school</td>
<td>22</td>
<td>62.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate degree “Diploma”</td>
<td></td>
<td>11.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>4</td>
<td>11.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of experience in nursing: Mean (SD) = 6.2 ± 3.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
</tr>
<tr>
<td>6-10</td>
</tr>
<tr>
<td>11-15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of experience in NICU: Mean (SD) = 4.2 ± 2.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
</tr>
<tr>
<td>6-10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Participation in training courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place of training courses (n = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside Iraq</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you read resources about NG tube?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books</td>
</tr>
<tr>
<td>Internet</td>
</tr>
</tbody>
</table>

### Table 2. Difference in Knowledge Among Age Groups

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Age Groups</th>
<th>N</th>
<th>Mean Rank</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23-30</td>
<td>19</td>
<td>15.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31-38</td>
<td>10</td>
<td>24.40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39-48</td>
<td>6</td>
<td>15.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td></td>
<td>5.510</td>
<td>2</td>
<td>.064</td>
</tr>
</tbody>
</table>

### Table 3. Difference in Knowledge among Educational Qualification Groups

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Educational Qualification</th>
<th>N</th>
<th>Mean Rank</th>
<th>Chi-Square</th>
<th>df</th>
<th>Exact Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursing high school</td>
<td>9</td>
<td>15.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Associate degree “Diploma”</td>
<td>22</td>
<td>13.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor’s degree</td>
<td>4</td>
<td>19.77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td></td>
<td>1.854</td>
<td>2</td>
<td>.396</td>
</tr>
</tbody>
</table>
Table 4. Difference in Knowledge Between Years of Experience in NICU Groups

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Years of experience in NICU</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Mann-Whitney U</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>1-5</td>
<td>23</td>
<td>16.67</td>
<td>383.50</td>
<td>107.500</td>
<td>.288</td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td>12</td>
<td>20.54</td>
<td>246.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Level of Knowledge About NG Tube

Figure 2. Level of Practices Related To NG Tube

Conclusion

According to the findings of the present study, the researchers highlighted and concluded the following: The majority of nurses were female, graduated from associate degree “diploma “, had (1-5) years of experience in general hospitals and in NICU, most of
them participation in training sessions about nasogastric tube inside Iraq, most of them uses resources such as internet to get information about NG tube. More than a half of participations have poor knowledge about nasogastric tube. Nurses' practices was fair about nasogastric tube, followed by 22.9% have good practices. There is no statistically significant correlation between participants' years of experience in NICU and their knowledge about NG tube.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Pediatric Nursing Unit, College of Nursing/ University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

13. Maheswari S, Muthamilselvi G. Assess the effectiveness of structured teaching programme on universal precaution among class IV employees working at Aarupadai Veedu Medical College and Hospital, Puducherry, India, American Journal of Nursing Research.2014;2: 26-30


20. Al-Gannem A. Effectiveness of Nursing Educational Program upon Nurses Knowledge and Practices Concerning Chemotherapy Precautions, University of Baghdad, College of Nursing, Unpublished doctorate dissertation. 2006; 91-92

Effect of Hypoxic Training in Some of the Physiological Capacity of Junior Players: Coefficient of Stability and Objectivity for Tests of Aerobic and Anaerobic Efficiency

Mohamad Musa Mohamad¹, Ali Hashim Hamza¹

¹The Open Educational College, Iraq

Abstract

The maintenance of efficiency of physical performance over the period of match is of great importance and of the main bases on which it depends in achieving the required results, as maintenance of level of physiological capacity, despite the exposure to physical effort is a clear indication of the weight of the team that has this attribute in addition to the special physiological abilities that are considered as an effective factor in the performance of the basic skills of the game, and through the humble experience of the researchers it was found that there is a lack of use of hypoxic training as well as ignoring the physiological abilities by teams' coaches because of lack of familiarity with these capabilities, so the researchers decided to study this problem and to know the impact of approach in the development of some physiological capabilities and its reflects on the motor skills of the players of the five football stadium.

Key words: Hypoxic Training, Physiological Capacity, Efficiency

Introduction

The idea of five football stadium game was launched in Uruguay in 1930 when Juan Carlos designed a form of five-players for each football team for youth competitions. So the game of five football stadium is regarded of the newly emerged games and despite the novelty of the game it has developed in many countries of the world and this is due to the reliance on sports-related sciences, which key purpose is to raise the physical and skilful level of players taking into account the specificity of each activity in terms of special physiological abilities and basic skills, as five football stadium player must possess high level of Physiological capabilities in order to be able to implement the basic skills of the game, because of games specifications that require high speed in performance, in addition to the requirements of the game that impose on players to continue the movement and not to stop. Since the game of five football stadium requires the player to assume defensive and offensive duties at the same time. The hypoxic training is considered of the important exercises in the process of organizing breathing which is one of the most important conditions for the progress of achievement as well as the role played by the physiological capacities. Therefore, the importance of research lies in placing approach in accordance with modern scientific contexts in order to develop the level of players of five football stadium to reach them to a good level. And the researchers saw it very important to be familiar with the impact of this approach in some physiological abilities and put it in front of coaches and players so that the workers in the field of training may have the chance to know the right training method and employ it to get excellent results. The aim of research is to: Prepare special exercises in a hypoxic way for junior players in five football stadium. Identify the impact of exercise, especially in the development of some physiological abilities of junior players in five football stadium. The researchers used the experimental approach to address the research problem. The research community of junior players in five football stadium in Al-Qasim Sports Club consisted of 14 players was selected, and ten of them were randomly tested in a simple way.
and were divided into two groups. The researchers used appropriate statistical methods to address acquired data including (Arithmetic mean, standard deviation, T-testing for independent and symmetric samples).

Methodology

Research community and its sample

The research community set the emerging 20 players in the Al-Qasim Sports Club, a simple sample of 16 players was selected randomly and was divided equally into two groups (controlled and experimental).

Means, devices and tools used in research:


Tools and devices used in research:

1 - Spirometer for measuring (Vital Capacity, range volume, Inspiratory reserve, Maximum exhalation rate
2 - Kymograph device
3 - Face masks - nose stoppers

Measurements used in the research

Vital capacity

The measurement is done by Spirometer

The test arbitrator holds the blowing tube connected to the device at the time of pause and then begins to take the maximum possible inhalation and maximal exhalation possible in the tube, the measurement is done automatically by the device mentioned via drawing curve on the graph where the point at which the device pointer ends from the curve graph is the value for the vital capacity with taking into account putting a stopper on the nose to ensure that the air does not exit.

Measurement of range volume

The measurement is done by Spirometer and through the same prepared chart that draws the diagram of breathing.

Measurement of inspiratory reserve

The measurement is also done by spirometer through the same prepared charts that draw us the curve of the process of breathing after the arbitrator takes the maximum possible inspiration.

Measurement of maximum expiratory flow

It is measured by spirometer too when the player takes the maximum inspiration from the air and then releases the maximum possible exhalation strongly and quickly inside the tube of the device then it measures the variable.

Measurement of Breath Muting

It is performed by the device of Kymograph + Sytograph and its accessories. The player can mute his breath so that the rib cage stops moving, then the indicator carries a straight line as long as the self-mute process continues and when the rib cage begins to move to start process of inhalation, the indicator moves to record a curve due to inhalation and exhalation process when the device is turned off.

Performance of research execution

Exploratory experiment: The researchers conducted exploratory experiment on (8) players from the youth representing Al-Qasim club and the experiment was conducted at (5:00) pm on (15/9/2017) in the yard of Al-Qasim Club to test capabilities. And after (7) days, exploratory experiment was repeated on (22/9/2017) on the same individuals and under the same conditions and the goal was to:

Identify the time taken for each test as well as the total tests time
Know difficulty level of tests for the research sample
Identify the difficulties faced by the researchers for the purpose to avoid them in the future
Extract the scientific foundations of the tests (stability and objectivity).

Scientific foundations of tests:

Credibility of test: The credibility is the accuracy with which the test measures the purpose for which the test was conducted. For the purpose of extracting credibility of the selected tests, the researchers
presented the contents of the tests to a group of experts and thus the researchers obtained the validity of the content.

**Stability of test:** In order to extract the stability coefficient for tests, the principle of constant testing is to be applied “which produces close results or the same results if applied more than once in similar conditions”. “Test and retest method” was used to calculate the stability coefficient with time interval (7) days between the first and second tests. The researchers extracted the stability coefficient by means of simple pearson correlation coefficient between the results of the first test and the second test and extracted the correlation significance by means of the statistical method (correlation coefficient) for the significance of the correlation as shown in Table (1)

**Results and Discussion**

**The cardiac tests:**

Cardiac tests were made on 4/10/2017 and on all individuals of sample that are consisted of (16) Players.

**Training approach:**

The researchers implemented the training approach on research sample totalling (16) players for 8 weeks with three training units a week and the implementation of approach in the set period reached (24) training units and the researchers took into consideration the gradient in distribution of intensity degrees starting from (60%-90%). The application of training approach was carried out on research sample during the period started from 6/10/2017 to 5/12/2017.

**Post-tests**

After completion of approach implementation, post-tests were conducted on 06/12/2017 on the members of the research sample and in the same way of cardiac tests and in the same place.

**Statistical means:** The researchers used the statistical Package For Social Sciences (SPSS) Including:

1 - Arithmetic mean
2 - Standard deviation
3 - Difference coefficient
4- T-test for interrelated samples .

**View, analyse and discuss the results**

Presentation, analysis and discussion of differences in both pre and post test results of the research sample. From table 2, we find that there are statistically indicative differences between pre and post measurement results and for the benefit of the post in all the values of the studied variables. The researchers attributes this for the effectiveness of approach prepared by the researchers in a manner consistent with the abilities and capabilities of the sample, because the training approaches lead to bringing about improvement and development in the different variables if built according to the scientific bases in the construction and organization of the training process and the formation of loads through the appropriate stress and this is consistent with Mohamed Othman, who pointed out that “the coach should be able to succeed in developing the training approach, which takes into account the size and intensity of loads used and their suitability to the abilities and capabilities of the players and consistent with their sports and physical attributes to be developed, which leads to the high level of their achievement”. Moreover, the researchers adds that the hypoxic training has a positive role in the development of some physical capabilities through the rapid strong action in competition, which requires players produce energy and increase it in the anaerobic way, so this method drove player to adapt to these competitions, which are short in a time but tiring, and this is what Essam Hilmi and Mohammed Jaber pointed out that “the increase of performance level in short competitions is the ability of the body to supply with energy for a short time without the use of large quantities of oxygen according to the anaerobic energy system concept”. Mohammed Othman confirms that “Oxygen-lacking training increases activity of energy production process during performance”. And we see that breath-muting and its reduction goes with wrestling player because he depends on the lack of oxygen and therefore the lack of breathing and the occurrence of the phenomenon of oxygen debt, which is an assistant factor for him during the performance, and this what Abu El-Ola Ahmed indicated to, “Training in conditions of hypoxia can be done by creating a high level of oxygen debt”. The researchers attribute reasons for the differences in the measurements under study to the nature of the hypoxic training, which imposed on the players levels of pressure on the functional organs, including the respiratory.
system because of the conditions surrounding breathing during performance, which was the main cause of the increase in the functional capacity of the lungs, which was one of the effects and changes that occurred due to the application of the training approach to the sample members. This means that there is an increase in the functional efficiency of the lungs and an increase in the pulmonary volume and capacity. This refers to the increase of players’ ability, as organized training has positive functional effects on respiratory function. This fact is consistent with Mohamed Hassan and Abu El-Ola, who indicated that sports training leads to changes in pulmonary volume, and this what leads to similar changes in body positions during athletic performance. “John West,” adds when doing breath-control training, some physiological adaptations result from low oxygen level and high level of carbon dioxide in the blood on the central chemical receptors in the brain by (80%-85%) and the surrounding chemical receptors in the carotid artery and the aorta causing an increase in the rate of pulse and breathing and disabling the voluntary act of stopping breathing. We add that the most important external factors are the big burdens suffered by the sample members as the high level of burdens on the respiratory system was offset by a significant effort by the respiratory muscles designed to compensate for the shortage of oxygen and this leads to flexibility of strength of breathing muscles that lead lungs to absorb a greater amount of air. Thus air ratio exiled increased. The larger the chest cavity, the greater the vital capacity and breathing volume of the players, and this what J. H. Creen refers to “the strength of the breathing muscles increase contraction while increasing physical activity, leading to a widening rib cage and entrance of more volume of air then increase in range of air volume. So breathing depth increases and improves the gas exchange between the blood and vesicles. The researchers sees lungs ability to absorb the maximum amount of air during the process of at a time through repeated physical efforts lead to the lifting of vital capacity and range volume to compensate for the shortage of oxygen and so the case with the maximum exhalation. This is confirmed by Guyton and Hall: “The higher the value of the vital capacity, the greater the forced expiratory volume and vice versa.

Table (1) shows the coefficient of stability and the coefficient of objectivity for tests of aerobic and anaerobic efficiency and correction of errors

<table>
<thead>
<tr>
<th>No.</th>
<th>Tests</th>
<th>Stability coefficient</th>
<th>Correlation significance calculated</th>
<th>Statistical significance</th>
<th>Objective coefficient</th>
<th>Correlation significance calculated</th>
<th>Objective significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Range volume</td>
<td>0.79</td>
<td>3.16</td>
<td>moral</td>
<td>0.88</td>
<td>4.54</td>
<td>moral</td>
</tr>
<tr>
<td>2</td>
<td>Inspiratory reserve</td>
<td>0.91</td>
<td>5.38</td>
<td>moral</td>
<td>0.92</td>
<td>5.75</td>
<td>moral</td>
</tr>
<tr>
<td>3</td>
<td>Vital Capacity</td>
<td>0.88</td>
<td>4.54</td>
<td>moral</td>
<td>0.91</td>
<td>5.38</td>
<td>moral</td>
</tr>
<tr>
<td>4</td>
<td>Breath-muting</td>
<td>0.80</td>
<td>3.27</td>
<td>moral</td>
<td>0.85</td>
<td>3.95</td>
<td>moral</td>
</tr>
<tr>
<td>5</td>
<td>Maximum exhalation</td>
<td>0.86</td>
<td>3.37</td>
<td>moral</td>
<td>0.89</td>
<td>3.98</td>
<td>moral</td>
</tr>
</tbody>
</table>

Table (2) shows the differences in the arithmetic mean, standard deviations, standard errors, calculated value, degree of freedom and level of indication:

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Difference in arithmetic mean</th>
<th>Standard Deviations</th>
<th>Standard error</th>
<th>Calculated value</th>
<th>Degree of freedom</th>
<th>Level of Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Range volume</td>
<td>12.53</td>
<td>3.428</td>
<td>1.31</td>
<td>5.42</td>
<td>15th</td>
<td>000</td>
</tr>
<tr>
<td>2</td>
<td>Inspiratory reserve</td>
<td>27.92</td>
<td>2.11</td>
<td>1.37</td>
<td>2.33</td>
<td>15th</td>
<td>000</td>
</tr>
<tr>
<td>3</td>
<td>Vital Capacity</td>
<td>7.260</td>
<td>15.7</td>
<td>5.51</td>
<td>4.21</td>
<td>15th</td>
<td>000</td>
</tr>
<tr>
<td>4</td>
<td>Breath-muting</td>
<td>12.28</td>
<td>7.60</td>
<td>2.25</td>
<td>5.84</td>
<td>15th</td>
<td>000</td>
</tr>
<tr>
<td>5</td>
<td>Maximum exhalation</td>
<td>11.48</td>
<td>3.17</td>
<td>1.37</td>
<td>2.31</td>
<td>15th</td>
<td>000</td>
</tr>
</tbody>
</table>
Conclusion

Hypoxic training has positive functional effects on the physiological abilities of players in the five football stadium. There were significant differences of variables under consideration between the pre and post measurements for the benefit of post -measurements. Occurrence of developments in the efficiency of the respiratory system through the results of functional measurements.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the The Open Educational College, Iraq and all experiments were carried out in accordance with approved guidelines.

References

12. Mohamed IE. Regulation of the training load for beginners swimming in terms of pulse rate and the concentration of lactic acid, PhD thesis, Helwan University, Faculty of Physical Education, 1999.
Effectiveness of an Education Program on Nurses knowledge concerning in Nursing Management for patients with Heart Block in Kirkuk Teaching Hospitals

Abid Salih Kumait AL-Jumaily, Khalidah Mohammed Khudur

1Department of Adult Nursing, College of Nursing, University of Kirkuk, Iraq, 2Ass. Professor, Head of Department of Adult Nursing, College of Nursing, University of Baghdad, Iraq

Abstract

Objective: The aim of the study is to assess the effectiveness of an educational program on Nurses’ knowledge concerning in nursing management toward heart block in Kirkuk’s teaching hospitals and to identifying the relationship between the nurses’ knowledge and their demographic characteristics. A descriptive study design (quasi experimental study) was carried out at Azadi teaching hospital and Kirkuk general hospital in Kirkuk city for nursing staff who worked at CCU, RCU unit, emergency unit and internal medicine unit, from February up to May, 2018. A non-probability (purposive) sample was selected and composed of (80) Nurses. Nurses was divided into two groups, study group consisted of (40) nurses exposed to the nursing educational program and control group consisted of (40) nurses were not exposed to the program from Azadi Teaching Hospital and Kirkuk General Hospital in Kirkuk city. The program and instruments were constructed by the researcher for the purpose of the study. The measurement of effectiveness of nursing educational program through the multiple choice questions includes (43) items. The study findings indicated that there were highly significant differences between pre and post tests in the study group in overall main domains related to nurses’ knowledge.

Keywords: Education Program, nursing management, Heart Block

Introduction

Atrioventricular (AV) heart block is marked by a disturbance in electrical impulse conduction from the atria to the ventricles. AV blocks are classified as first-degree, second-degree, and third-degree. Third-degree blocks are the most dangerous. Cardio Vascular Disease remains a major healthcare problem and one of the most consumers of the public health resources. Heart block (HB) remain the commonest cause of death. As in statistical reports of the World Health Organization (WHO); 2011, Sudan; 212.0, Libya; 199.3 and Jordan; 162.5. Despite the lack of accurate epidemiology data for AVB, it is clear that it is not uncommon in both apparently healthy populations and those with overt heart disease. which increases to 5% in men over the age of 60 with cardiac diseases. The prevalence of second-degree AVB for Mobitz II block is estimated to be 3% in patients with HF, and it is estimated that 5% to 10% of people will develop a third-degree heart block in those >70 years old and having a history of heart disease. Atrioventricular (AV) block is a common complication of acute Myocardial Infarction (MI). In setting of Inferior MI, this was even as high as 28%. The prevalence of first-degree atrioventricular block in the general population is approximately 4% and the treatment of patients with heart block will improve medical and device therapy.

Methodology

Design of the Study:

A quasi-experimental design (pre-post test) study had been used through the present study with the
Results and Discussion

Relative to “Gender” subjects are from female are more illustrated, since 23(57.5%), and 25(62.5%) are accounted in the study and controlled groups respectively, and most of “Age Groups”, are focused at the first two groups since 35(87.5%), and 37(92.5%) are accounted in the study and controlled groups respectively, as well as most of residential subjects, are focused at urban area, since 28(70.0%), and 31(77.5%) are accounted in the study and controlled groups respectively. With regard to marital status, shows that single subjects has recorded the most of study group, while married status has recorded the most of study subjects in the controlled group, and they are accounted 26(65.0%), and 20(50.0%) respectively. Finally, educational achievement of studied subjects shows that most of them has graduate institute, and bachelor or more degrees, and they are accounted 34(85.0%), and 33(82.5%) in the study and controlled groups respectively. Table (2) indicate that the majority of studied subjects are worked at CCU unit, since they are accounted 15(37.5%), and 14(35.0%) in the study and controlled groups respectively, as well as the most of training named concerned with the studied subjects previously was at CCU unit, since they are accounted 21(52.5%), and 22(55.0%) in the study and controlled groups respectively. Table (3) shows highly significant differences at P<0.01 toward impact of applied program through raising knowledge grades of studied respondents at post1 period, and that could be enable to confirms importance and successfulness of applying the proposed program. The results of the controlled group has recorded completely immovable responses over the three periods of times with low level of assessed. Table (4) reported highly significant differences at P<0.01 toward impact of applied program through raising knowledge grades of studied respondents at post1 period, and that could be enable to confirms importance and successfulness of applying the proposed program. The results of the controlled group has recorded completely immovable responses over the three periods of times with low level of assessed. Results shows that weak relationships are a proved with (SDCv.), since no significant relationships were accounted at P>0.05. Table (1) Relative to “Gender” the female are more illustrated, since 23(57.5%), and 25(62.5%) are accounted in the study and controlled groups respectively. These finding is agreement with the result of (9) (2016) who find More than three quarters of participants were females (79.4%). Most of the nurses age were between (20 to 39 years) and constitute 35(87.5%), 37(92.5%) respectively but these findings disagree with the study of (8) (2018) who find More than three quarters of participants were females (79.4%). Most of the nurses age were between (20 to 39 years) and constitute 35(87.5%), 37(92.5%) respectively but these findings disagree with the study of (9) (2016) in Egypt, who reported that more than one third of the study sample aged between 40 to 49 years. With regard to the residence most of residential the urban area is 28(70.0%), and 31(77.5%) are accounted in the study and controlled groups respectively. These findings disagree with the study of (8) (2016) in Egypt who reported that more than half of the sample (62%), were living in rural areas. Table (2) shows the most of training named concerned with the studied subjects previously was at CCU unit, since
they are accounted 21(52.5%), and 22(55.0%) in the study and controlled groups respectively. This result is in agreement with the finding obtained from (10) (2012) who ensure nursing staff’s abilities through mandatory annual competency sessions. The results about first degree heart block (FD) at table (4) shows highly significant differences at P<0.01 of study group while controlled group has recorded completely immovable responses over the three periods of times with low level of assessed. This find is agreement with (12) who mentioned there is that medical and nursing staff knowledge and skills of ECG interpretation related to heart block increase with frequent education program and training. With regard to the nurses knowledge concerning in management of Second degree heart block which summarized at table (5) reported highly significant while controlled group refers to low level of significant. The results shows that there were no significant differences between nursing staff knowledge and age at P value ≤ 0.05. Our result is agreement with (13) study (2010) and he find there was no statistically significant difference between the mean knowledge score and age (14) Table (6) Results shows that weak relationships are a proved with (SDCv.), since no significant relationships were accounted at P>0.05. This result is agreement with the findings of the study done by (14) (2012) the results of the study shows, there is no association exists between knowledge score after administration of information booklet about heart block with selected demographic variable as gender educational status, occupation, family income. The entire demographic variables are working independently.

**Table (1): Distribution of the studied groups according to socio-demographical characteristics variables with comparisons significant**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Study</th>
<th>Control</th>
<th>C.S. (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>42.5</td>
<td>15</td>
</tr>
<tr>
<td>Female</td>
<td>23</td>
<td>57.5</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Age Group</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>26</td>
<td>65.0</td>
<td>17</td>
</tr>
<tr>
<td>30 – 39</td>
<td>9</td>
<td>22.5</td>
<td>20</td>
</tr>
<tr>
<td>40 – 49</td>
<td>4</td>
<td>10.0</td>
<td>3</td>
</tr>
<tr>
<td>50 – 59</td>
<td>1</td>
<td>2.50</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>28</td>
<td>70.0</td>
<td>31</td>
</tr>
<tr>
<td>Rural</td>
<td>12</td>
<td>30.0</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>26</td>
<td>65.0</td>
<td>16</td>
</tr>
<tr>
<td>Married</td>
<td>12</td>
<td>30.0</td>
<td>20</td>
</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>5.0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Educational achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparatory Nursing</td>
<td>6</td>
<td>15.0</td>
<td>7</td>
</tr>
<tr>
<td>Nursing Institute</td>
<td>14</td>
<td>35.0</td>
<td>10</td>
</tr>
<tr>
<td>Bachelor and more</td>
<td>20</td>
<td>50.0</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
</tbody>
</table>
Table (2): Distribution of the studied groups according to training in cardiac care indicators with comparisons significant

<table>
<thead>
<tr>
<th>Training</th>
<th>Groups</th>
<th>Study</th>
<th>Control</th>
<th>C.S. (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Classes</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Work place</td>
<td>CCU Unit</td>
<td>15</td>
<td>37.5</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Medical Ward</td>
<td>8</td>
<td>20.0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Emergency Unit</td>
<td>6</td>
<td>15.0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>ECG Unit</td>
<td>2</td>
<td>5.00</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>RCU Unit</td>
<td>9</td>
<td>22.5</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>Name of training</td>
<td>CCU</td>
<td>21</td>
<td>52.5</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>RCU</td>
<td>15</td>
<td>37.5</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>ECG</td>
<td>4</td>
<td>10.0</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>40</td>
</tr>
</tbody>
</table>

Table (3): Descriptive Statistics of the studied groups according to (Nurses knowledge concerning in management of First degree Heart Block with comparisons significant (No.40)

<table>
<thead>
<tr>
<th>Nurses knowledge concerning in management of First degree heart block (Fd)</th>
<th>Period</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MS</td>
<td>SD</td>
</tr>
<tr>
<td>First degree AV heart block caused by delay in the conduction of an electrical impulse between</td>
<td>Pre</td>
<td>0.05</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>Post1</td>
<td>0.85</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td>Post2</td>
<td>0.95</td>
<td>0.22</td>
</tr>
<tr>
<td>First degree AV heart block is considered</td>
<td>Pre</td>
<td>0.32</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>Post1</td>
<td>0.88</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Post2</td>
<td>0.97</td>
<td>0.16</td>
</tr>
<tr>
<td>Size and shape of both the P wave and QRS complex may</td>
<td>Pre</td>
<td>0.33</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>Post1</td>
<td>0.83</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>Post2</td>
<td>0.83</td>
<td>0.38</td>
</tr>
</tbody>
</table>
Table (4): Descriptive Statistics of the studied groups according to (Nurses knowledge concerning in management of Second degree heart block (Sd)) along studied periods with comparisons significant

<table>
<thead>
<tr>
<th>Period</th>
<th>Study</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MS</td>
<td>SD</td>
</tr>
<tr>
<td>Mobitz (1) heart block</td>
<td></td>
<td></td>
</tr>
<tr>
<td>be progress until</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>0.30</td>
<td>0.46</td>
</tr>
<tr>
<td>Post1</td>
<td>0.63</td>
<td>0.49</td>
</tr>
<tr>
<td>Post2</td>
<td>0.73</td>
<td>0.45</td>
</tr>
<tr>
<td>Mobitz (1) AV heart block occurs when the electrical pulse travelling from the atria interrupted at</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>0.15</td>
<td>0.36</td>
</tr>
<tr>
<td>Post1</td>
<td>0.72</td>
<td>0.45</td>
</tr>
<tr>
<td>Post2</td>
<td>0.85</td>
<td>0.36</td>
</tr>
<tr>
<td>Mobitz (2) AV heart block occur when there is an intermittent interruption in the electrical system at</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>0.22</td>
<td>0.42</td>
</tr>
<tr>
<td>Post1</td>
<td>0.57</td>
<td>0.50</td>
</tr>
<tr>
<td>Post2</td>
<td>0.65</td>
<td>0.48</td>
</tr>
</tbody>
</table>

Table (5): Relationships (Analysis of Covariance) concerning Compliance Regarding to Life Style Modification in the study group and SDCv.

<table>
<thead>
<tr>
<th>Group</th>
<th>Source of Variations</th>
<th>Type III Sum of Squares</th>
<th>d.f.</th>
<th>Mean Square</th>
<th>F Statistic</th>
<th>Sig. Levels</th>
<th>C.S. (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study</td>
<td>Intercept</td>
<td>43205.15</td>
<td>1</td>
<td>43205</td>
<td>891.0</td>
<td>0.000</td>
<td>HS</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>2.180</td>
<td>1</td>
<td>2.180</td>
<td>0.045</td>
<td>0.834</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>AgeGroup</td>
<td>90.90</td>
<td>3</td>
<td>30.30</td>
<td>0.625</td>
<td>0.605</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Residency</td>
<td>168.20</td>
<td>1</td>
<td>168.20</td>
<td>3.469</td>
<td>0.072</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Marital Status</td>
<td>2.160</td>
<td>2</td>
<td>1.082</td>
<td>0.022</td>
<td>0.978</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Education Levels</td>
<td>203.19</td>
<td>2</td>
<td>101.60</td>
<td>2.095</td>
<td>0.141</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Error</td>
<td>1454.71</td>
<td>30</td>
<td>48.49</td>
<td>R-Squared = 0.281</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>282523</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

Nurses who work in medical department have minimum knowledge toward management of patients with heart block. Application of nurses education program is improve nurses knowledge toward management of heart block also the study recommended Encourage nurses to participate in sessions, conferences and seminar related to care of patients with heart block.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Kirkuk, Iraq and all experiments were carried out in accordance with approved guidelines.
References

2. World health organization (WHO). Coronary Heart Disease /selecting cause of death rate per 100.000. 2011.
12. Mohan S. A study to assess the knowledge regarding interpretation of life threatening arrhythmias and its emergency management among cardiac nurses in ,scitms.2010; 50-52
Effectiveness of Education Program upon Patient’s Knowledge toward Hemophilia among more than Fourteen Years Old in Thi-Qar Heredity Center

Ali Abdulretha¹, Salma Khadom Jehad², Kahtan Hadi Hussen²

¹Institute Thi-Qar High Health, Iraq, ²College of Nursing, University of Babylon, Iraq

Abstract

Data was collected through the use of hemophilia patients knowledge tests which were developed for the purpose of the study, which consists of three parts: The first part is related to the demographic characteristics like patients’ age, level of education, marital status, type of parents marriage relationship, residential area, type and severity of hemophilia; The second part consists of hemophilia patients’ knowledge items which is a list of (42) items in regard to definition of hemophilia, symptoms of bleeding, major common bleeding, site of bleeding was also developed for the determination of the characteristics of the subject. The reliability of the instrument was determination through use of person correlation coefficient for the test retest approach was (0.94) for hemophilia patient’s knowledge. Instrument validity was determined through a panel of experts. Analysis of data was performed through the application of descriptive statistics (frequency, percentage) and inferential statistics (t-test). The study results had revealed that the study group participant had benefited from the implementation of the educational program. However, their knowledge were adequately improved and developed.

Key words: Hemophilia, Education Program, Thi-Qar.

Introduction

Hemophilia refers to a collection of bleeding disorders in which there is a deficiency in one of the factors necessary to blood clotting such as factor VIII, IX or XI². Hemophilia is the most common hereditary coagulation factor deficiency occurring primarily amongst males characterized by bleeding in muscles and joints and can further lead to chronic pain and joint disease (International Journal of Multidisciplinary Research, 2016). When a person with hemophilia is injured he does not bleed harder or faster than a normal person but will have prolonged bleeding because he cannot make a firm clot²

The Types of Hemophilia

Hemophilia is one of the common bleeding disorders and is classified as follows:

Hemophilia A – It is also called classic hemophilia, it is four times more common than hemophilia B, and it occurs when factor VIII levels are deficient.

Hemophilia B – It is also called Christmas disease, it occurs when factor IX levels are deficient.

Hemophilia C – It occurs when factor (F XI) levels are deficient.

Acquired hemophilia A person can develop hemophilia as a result of illness, medications, or pregnancy. Acquired hemophilia is extremely rare and usually resolves itself with proper diagnosis and treatment (World Federation Hemophilia, 2012).

Results and Discussion

Table (No.1) shows that the high percentage of the study group age was between (14-28) years old which accounted (44%), (60%) of them were single. In regard to hemophilia patient’s parents marriage relationship, those who were relative accounted for (68%), in respect to the family types (56%) were extended concerning the hemophilia patient’s educational level (20%) of them were able to read and write. In regard to patient’s employment, those who were governmental employee constituted (44%), in respect to the residential
areas where sample live high percentage represented (64%), live in urban area, (64%) of them their monthly income was not enough, (68%) had moderate disease severity and (60%) of participants were regularly visits the center. Table 2 shows that the high percentage of the study group age was between (14-28) years old which accounted (40%), (58%) of them were single. In regard to hemophilia patient’s parents marriage relationship, those who were relative accounted for (64%), in respect to the family types (64%) of sample live within extended. Concerning the hemophilia patient’s educational level (24%) of them were primary school graduated. In regard to patient’s employment, those who were governmental employee constituted (48%), in respect to the residential areas where sample live high percentage represented (60%), live in urban area, (68%) of them their monthly income was not enough, (68%) had moderate disease severity and (64%) were regularly visits the center. Table 3 indicated that there was no significant differences between the study and the control groups knowledge relative to the pre-test. Table 4 revealed that there was significant differences between the study group knowledge relative to the pre and post-test 1. The findings of this table showed that there was significant differences between the study and the control group’s knowledge relative to the pre and post-test 1. The findings reveal that the highest percentage of the sample live high percentage represented (60%), live in urban area, (68%) of them their monthly income was not enough, (68%) had moderate disease severity and (64%) were regularly visits the center. Table 2 shows that the high percentage of the study group age was between (14-28) years old, for the study and the control groups, more than the half of the study and control groups sample (60% and 58%) are single and this is supported by a study done by (Jennifer, 2006) he mentioned that more than half of the sample are single, around (68 % and 64%) of them have relative of parents marriage relationship both the study and control groups, while (56% and 64%) of them live with extend family of the study and control groups and this agrees with the result of (Sacks and Rhona, 2006) study in which he indicated that (53.3%) of the hemophilia patients lived with extend family, the present study found that around (20%) of them are able to read and write while just (16% and 20%) are un able to do so. Participants for both study and control groups, and (44% and 48%) of the study and control groups of them are governmental employee, and also the researcher finds that (64% and 60) of the patients live in urban of the study and control groups and this comes with the results of a study carried by (Jennifer, 2017) in the Hereditary Blood Disease Center in Al-Nasiriya, which revealed that (67.5%) of the patients live in urban, while (64% and 68%) of them their monthly income is not enough the study and control groups, found (68%) of them have moderate severity of disease, and around (60% and 64%) of them regularly visits the center the study and control groups. (Table 3) it indicates that the hemophilia patients have a low level of education and their knowledge and practices regarding the management of disease, and this is clear when those patients are not formally exposed to that information as they were assessed before starting the study. These results are consistent with the findings of Hemophilia Foundation Australia (HFA), 2009 which indicate that the hemophilia patients in developing countries need an educational program about hemophilia, and how to manage their himself during episodes of bleeding.

Part-I: Socio-Demographic Characteristics Related to the Patients with Hemophilia

Adequate knowledge and practices has been recognized as a necessary ingredient in the patients’ ability to lead normal and productive life to their himself (Badran, 2015). The patient’s knowledge in the self care is considered one of the essential tools in raising the standard of care giving by the himself. The hemophilia patients must have sound understanding of scientific principles underlying each step of any procedure in order to prevent possible risk factor, so they become able to apply their knowledge into effective self care. The results reveal that the highest percentage of the hemophilia patients are selected for the implementation of the educational program and comprehensive self care (Table 1 and Table 2) shows that (44 %) of patients are in age (14-28) years old, for the study and the control groups, more than the half of the study and control groups sample (60% and 58%) are single and this is supported by a study done by (Jennifer, 2006) he mentioned that more than half of the sample are single, around (68 % and 64%) of them have relative of parents marriage relationship both the study and control groups, while (56% and 64%) of them live with extend family of the study and control groups and this agrees with the result of (Sacks and Rhona, 2006) study in which he indicated that (53.3%) of the hemophilia patients lived with extend family, the present study found that around (20%) of them are able to read and write while just (16% and 20%) are un able to do so. Participants for both study and control groups, and (44% and 48%) of the study and control groups of them are governmental employee, and also the researcher finds that (64% and 60) of the patients live in urban of the study and control groups and this comes with the results of a study carried by (Jennifer, 2017) in the Hereditary Blood Disease Center in Al-Nasiriya, which revealed that (67.5%) of the patients live in urban, while (64% and 68%) of them their monthly income is not enough the study and control groups, found (68%) of them have moderate severity of disease, and around (60% and 64%) of them regularly visits the center the study and control groups. (Table 3) it indicates that the hemophilia patients have a low level of education and their knowledge and practices regarding the management of disease, and this is clear when those patients are not formally exposed to that information as they were assessed before starting the study. These results are consistent with the findings of Hemophilia Foundation Australia (HFA), 2009 which indicate that the hemophilia patients in developing countries need an educational program about hemophilia, and how to manage their himself during episodes of bleeding.

The statistical differences between the hemophilia patient’s knowledge of study and control groups

Through the application of the t-test the study findings indicated that the hemophilia patients knowledge didn’t show any statistical differences between the groups in the pre test occasion (Table 3). This means that there are no differences in knowledge in the study and control groups prior to the implementation of the educational program. When t-test was applied again, statistically significant differences were identified between the knowledge of the study group after the implementation of the education program and post-test 1 with the relative comparison of the pre test occasion (Table4). The present study agrees with HFA.,2000 , a post test evaluation was conducted to determined
the effect of education program on hemophilia patients knowledge toward self care management showed statistically significant impact of the program upon those patient’s self care knowledge, particularly hemophilia patients of (14-28) years old which was approximately consistent with the finding of our present study. In a correlation study Among the 40 subjects aged from 11 to 20 years (40) hemophilia patients who were interviewed for the determination of the relationship between their knowledge relative to their self care management, the study finding indicated that there was correlation between self care management status and hemophilia patients knowledge, and these were considered as important factors for determining the hemophilia patients self care management status (Valizadeh., et al, 2014). The effect of the educational program implementation was documented by (Zwaan, 2015) and provided support the effect of our education program implementation when they found that there was positive correlation between hemophilia patient’s knowledge relative to their self care management status due to such implementation. In another study, conducted by (Evat., 2010) a post test was conducted to determine the effectiveness of educational program upon hemophilia patient’s knowledge in which (18) classes for (28) hemophilia patients for (2) months. The results show significant improvement of such educational activity. The finding of the present study revealed that there were no significant differences between the control group’s knowledge when they compared between the pre and the posttest occasion. This means that hemophilia patients knowledge and didn’t show any significant modification improvement or changes. Throughout the implementation of the Education Program, it had been shown that there were no significant changes experienced by the control group regardless of the time consumed between the pre and the post test 1 (Table 5). That means, no single patient had been acquired specific education information out of the Heredity Center. In contrast the study group had significant benefited out of the educational program when they were compared with the control group in the post test 1 occasion (Table 6). Scientifically speaking, it was determined that the present Education Program had made a significant contribution to the improvement of the hemophilia patient’s knowledge, which was very obvious throughout the course of the present study. Giulotto and others (2003) evaluated the impact of Education Program through a comparison between hemophilia patient who attended frequently with those who were infrequently visiting the heredity centers in Kenya. The study found that a Education Program did succeed in increasing hemophilia patient’s knowledge, which was very obvious throughout the course of the present study.

Table 1. Distribution of the study group according to their demographical characteristics

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Ratings and interval</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>14-28</td>
<td>11</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>29-43</td>
<td>8</td>
<td>32.0</td>
</tr>
<tr>
<td></td>
<td>44- And more</td>
<td>6</td>
<td>24.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25</td>
<td>100%</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>15</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>10</td>
<td>40.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25</td>
<td>100%</td>
</tr>
<tr>
<td>Type of parent marriage relationship</td>
<td>Relative</td>
<td>17</td>
<td>68.0</td>
</tr>
<tr>
<td></td>
<td>Non relative</td>
<td>8</td>
<td>32.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25</td>
<td>100%</td>
</tr>
<tr>
<td>Family type</td>
<td>Nuclear</td>
<td>11</td>
<td>44.0</td>
</tr>
<tr>
<td></td>
<td>Extend</td>
<td>14</td>
<td>56.0</td>
</tr>
</tbody>
</table>
Continued Table 1. Distribution of the study group according to their demographical characteristics

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Ratings and interval</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14-28</td>
<td>10</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>29-43</td>
<td>9</td>
<td>36.0</td>
<td></td>
</tr>
<tr>
<td>44- And more</td>
<td>6</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>14</td>
<td>58.0</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>11</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Type of parent marriage relationship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative</td>
<td>16</td>
<td>64.0</td>
<td></td>
</tr>
<tr>
<td>Non relative</td>
<td>9</td>
<td>36.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Family Type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>9</td>
<td>36.0</td>
<td></td>
</tr>
<tr>
<td>Extend</td>
<td>16</td>
<td>64.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Un read and write</td>
<td>5</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Able to read only</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Able to read and write</td>
<td>5</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Primary school graduate</td>
<td>6</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td>2</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>4</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>College and above</td>
<td>3</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Distribution of the control group according to their demographical characteristics

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Ratings and interval</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Un read and write</td>
<td>4</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>Able to read only</td>
<td>1</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Able to read and write</td>
<td>5</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>primary school graduate</td>
<td>4</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td>4</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>4</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>College and above</td>
<td>3</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 3. The comparative difference between the study group and the control groups knowledge scores of the pre-test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Group X̄</th>
<th>Control Group X̄</th>
<th>t-Observed</th>
<th>P≤ 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>58.2000</td>
<td>64.0400</td>
<td>-1.354</td>
<td>0.182</td>
</tr>
</tbody>
</table>

\[ t \text{ critical } = 2.009 \]
\[ df = 48 \]

Table 4 The comparative difference between the study group knowledge scores of the pre and post test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Group</th>
<th>t-Observed</th>
<th>P≤ 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post1-test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>58.2000</td>
<td>99.1600</td>
<td>8.289</td>
</tr>
</tbody>
</table>

\[ t \text{ critical } = 2.064 \]
\[ df = 24 \]

Table 5. The comparative difference between the control group knowledge scores of the pre and post test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>t-Observed</th>
<th>P≤ 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post1-test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>64.0400</td>
<td>63.800</td>
<td>0.44</td>
</tr>
</tbody>
</table>

\[ t \text{ critical } = 2.064 \]
\[ df = 24 \]

Table 6. The comparative difference between the study group and the control groups knowledge scores of the post-test.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Group X̄</th>
<th>Control Group X̄</th>
<th>t-Observed</th>
<th>P≤ 0.01</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>99.1600</td>
<td>63.8000</td>
<td>9.206</td>
<td>0.000</td>
</tr>
</tbody>
</table>

\[ t \text{ critical } = 2.009 \]
\[ df = 48 \]

**Conclusion**

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

1. International Journal of Multidisciplinary Research and Development Volume 3; Issue 3; March 2016;


Evaluation of Lipid Profile and Thyroid Function in Hyper and Hypotensive Patients: a Case Control Study

Falah S. Al-Fartusie, Nabaa Nabil, Dheaa Sh. Zgeer

1 Department of Chemistry, College of Science, Mustansiriyah University, Baghdad, Iraq
2 Forensic DNA Center for Research and Training, Al-Nahrain University, Baghdad, Iraq

Abstract

The objective of this study was to evaluate the lipid profile and thyroid function in hyper and hypotensive patients. This case-control study was conducted among the hyper and hypotensive patients from Jan to June, 2018 in Baghdad. The participants were evaluated out of which 40 were hypertensive, 37 were hypotensive and 66 were enrolled as a normal control group. The levels of serum cholesterol, triglyceride, HDL, LDL and VLDL were determined by a spectrophotometer, as well as serum levels of thyroid hormones (TSH, fT4 and fT3) were determined by ELISA technique. The results indicated the presence of a significant increase in serum levels of cholesterol, triglyceride, VLDL and fT4 for patients with hypertension (p<0.05), and a significant decrease in serum level of triglyceride in patients with hypotension when compare with control. In addition, the results show the presence of a significant increase in cholesterol, triglyceride, HDL and VLDL levels as well as a highly significant decrease in fT4 level of patients with hypertension compared with patients with hypotension.

Keywords: lipid profile; thyroid hormones; blood pressure; cholesterol; T4 and T3.

Introduction

Blood pressure is the force exerted by blood on the walls of blood vessels or heart chambers. Blood pressure can be measured in capillaries and pulmonary circulation vessels. However, the term “blood pressure” without any specific descriptors usually refers to systemic arterial blood pressure, which is the blood pressure that flows in the arteries of the circulatory system. In clinical practice, this pressure is measured in mm Hg and is usually obtained by using the brachial artery of the arm. The arterial blood pressure in the large vessels consists of several distinct components, including systolic (higher) pressure and diastolic (lower) pressure 1-4. The systolic pressure happens when the left ventricle is most contracted; the diastolic pressure occurs when the left ventricle is most relaxed prior to the next contraction.

The normal systolic pressure, when the person sitting quietly, is within the range of 100–140 mmHg systolic and 60–90 mmHg diastolic 3,4. Thyroid gland is an endocrine gland, found in the neck and produces thyroid hormones. Thyroid hormones, involving thyroxine (T4) and triiodothyronine (T3), strongly affect energy metabolism, regulate temperature and produce body heat. They also play an important role in the skeleton, muscle and cardiac contraction, memory and sleep 5. Thyroid hormone synthesis depends on factors such as nutritional availability of iodine, and is mostly regulated by the thyroid stimulating hormone (TSH), sometimes called thyrotropin, a hormone produced by the pituitary gland. The synthesis and secretion of TSH is stimulated by the hypothalamic thyroid releasing hormone (TRH) and inhibited through negative feedback of the thyroid hormone itself 6. Thyroid hormones have profound metabolic effects, and the most interesting is increased energy 7. There are two types of intrinsic thyroid diseases, hyperthyroidism (overproduction) and hypothyroidism (underproduction). Hypothyroidism is a common disorder known as the high concentration of TSH with low concentrations of fT4, the most common in women.
This is often caused by autoimmune thyroiditis where the immune system produces antibodies against normal thyroid tissue and/or antibodies that inhibit TSH receptors. Thus interfering with the natural regulation of thyroid hormone synthesis. The lipid family contains several different structures with different functions, including fatty acids, triglyceride (TG), phosphate lipids and cholesterol. It has the ability to bind with protein to form lipoproteins, the form that enables lipids to be soluble and transport in human plasma. The lipoproteins are divided into four groups: Chylomicrons, low-density lipoproteins (VLDL), low-density lipoproteins (LDLs) and high-density lipoproteins (HDLs). LDL particles increase the risk of cardiovascular disease and arteriosclerosis. Although the pathogenesis of atherosclerosis remains poorly understood, the accumulation of modified lipoproteins in vessel walls, such as oxidized LDL and other lipid metabolites, is thought to create a lipotoxic environment. It has been found that thyroid hormones play an important role in regulating the metabolism of lipid. Thyroid dysfunctions can result in lipid abnormalities that increase the risk of endothelial dysfunction, hypertension and cardiovascular disease.

Accordingly, this study was designed to evaluate the lipid profile and thyroid function in Iraqi patients with hyper and hypotension.

Materials and Method

Patients and Controls

This study was conducted between Jan and June 2018, at the Dubai Laboratory / Almaghrib Street and clinical laboratory at Chemistry department/ College of Science/ Mustansiriyah University, Baghdad, Iraq. The study included 40 people (male and female) with high blood pressure, 37 with low blood pressure and 66 healthy people. Patient’s ages ranged between (15-75) years and healthy volunteers between (15-72) years. Patients were collected from Baghdad Teaching Hospital. The symptoms and signs of the disease were diagnosed by specialist doctors in the hospital.

Sample Collection and Preparation

Five millilitres of blood, of each individual of patients and healthy control, were withdrawn from vein. Blood sample was placed in a gel tube and allowed to clot on bench for 20 min, then centrifuged at 3000 rpm for 10 min. The obtained serum was stored in a refrigerator at −20 °C for subsequent analysis.

Sample Analysis

Serum levels for lipid profile (cholesterol, triglyceride and HDL) were determined using colorimetric method by following the protocol of the commercially available Linear kits (Spain). LDL and VLDL were also calculated. The serum levels of TSH, fT3 and fT4 were determined by an automated ELISA microplate reader analyzer, model IRE 96-SFRI - MedicalExpo (SPAIN), following the protocol of the commercially available AcuBind TSH Elisa kit supplied by Monobind Inc. (USA), Bioactive diagnostic fT3 and fT4 Elisa kits supplied by bioactiva diagnostica GmbH (Germany).

Statistical analysis

All data were analyzed using descriptive statistics and ANOVA one way test of the Statistical Package for Social Sciences (SPSS) program version 20.0. The resulting values were expressed as mean ± standard deviation (SD). Pearson’s correlation analysis was also carried out to determine the relationships between all study variables. The statistical tests were significant at $p <0.05$ and highly significant at $p <0.01$ with a confidence interval of 95%

Results and Discussion

All obtained data were analyzed statistically and presented as mean ± standard deviation. The $p$ values were also included to verify differences in levels of study parameters between patients and control. The calculated mean values ± SD of lipid profile (cholesterol, triglycerides, HDL, LDL and VLDL) in sera of control, patients with low blood pressure and patients with high blood pressure are summarized in Table 1. The results indicated the presence of a significant increase in serum levels of cholesterol, triglyceride and VLDL for patients with high blood pressure when compare with control. While no significant differences were found in HDL and LDL levels. The results also indicated the presence of a significant decrease in serum level of triglyceride and non-significant differences in cholesterol, HDL, LDL and VLDL for patients with low blood pressure in comparison with control. In addition, the results show the presence of a significant increase in cholesterol, triglyceride, HDL and VLDL levels of patients with high blood pressure compared with patients with low blood pressure, while no significant difference was found in LDL level. The mean values ± SD of thyroid hormones (TSH, fT4 and f T3) for the three study groups were calculated from
the obtained data and the collective results are presented in Table 2. The serum mean values ± SD of thyroid hormones indicated the presence of a significant increase in fT4 concentration in patients with low blood pressure compared with control group (p<0.05), as well as a highly significant decrease in fT4 concentration patients with high blood pressure compared with patients with low blood pressure group (p<0.001). No significant difference was detected between patients with low blood pressure and control groups. In addition, the results further statistically reveal no significant difference in levels of TSH and fT3 between both patients groups and control group (p>0.05). The correlation between all lipid profile and thyroid hormones parameters included in this work was studied for hypertension and hypotension groups, respectively, using Pearson correlation analysis. The collective results are displayed in Tables 3 and 4. The analysis showed no correlation between all parameters and in both cases, hyper and hypotension. Hypertension affects approximately 26% of the adult population worldwide. Hypertension is an independent indicator of cardiovascular disease and cerebrovascular disease leading to death. It should be noted that most blood pressure studies may focus on high blood pressure, while studies on low blood pressure are rare. Unlike high blood pressure, low blood pressure is not associated with serious illness or death, and it is widely accepted that lower blood pressure is better than elevation. However, most studies, based on whether low blood pressure can lead to adverse health outcomes, have shown that low blood pressure is associated with physical or mental symptoms or illnesses. It has been reported previously by Hitesha et al. that the levels of cholesterol, triglyceride and VLDL in hypertensive patients were significantly higher than those in normal persons, and these results are consistent with the current work results. A previous study conducted by Choudhury et al. has reported that the serum levels of cholesterol, triglyceride and LDL were higher in hypertensive patients than those of healthy subjects, which agree with the results obtained in this work. Similar results have suggested an association between hypertension with risk factors such as hypercholesterolemia. Also it was found that the hypertensive patient is more likely to have metabolic syndrome compared to the normal person, and increased serum lipid profile is associated with high blood pressure cases. The results of the present study strongly support this point where similar findings were recorded, see Figures 1-4. It was found that hypertension was directly associated with high levels of triglyceride, cholesterol and LDL during pregnancy, suggesting that lipid profile plays a vital role in regulating blood pressure for pregnant women.

Table 1: Levels of Lipid profile in patients with high and low blood pressure and healthy volunteers.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control</th>
<th>Low B.P</th>
<th>High B.P</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>Mean</td>
<td>S.D</td>
</tr>
<tr>
<td>Chol.(mg/dl)</td>
<td>170.3</td>
<td>43.03</td>
<td>165.0</td>
<td>26.73</td>
</tr>
<tr>
<td>Tri(mg/dl)</td>
<td>126.5</td>
<td>86.40</td>
<td>112.7</td>
<td>35.74</td>
</tr>
<tr>
<td>HDL(mg/dl)</td>
<td>37.79</td>
<td>7.62</td>
<td>32.29</td>
<td>4.88</td>
</tr>
<tr>
<td>LDL(mg/dl)</td>
<td>105.5</td>
<td>38.83</td>
<td>110.2</td>
<td>22.10</td>
</tr>
<tr>
<td>VLDL(mg/dl)</td>
<td>25.55</td>
<td>17.14</td>
<td>22.53</td>
<td>7.09</td>
</tr>
</tbody>
</table>
Table 2. Levels of thyroid hormones in patients with high and low blood pressure and healthy volunteers.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control &amp; Low B.P</th>
<th>Control &amp; High B.P</th>
<th>High B.P</th>
<th>p values</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH (µU/ml)</td>
<td>Mean</td>
<td>S.D</td>
<td>Mean</td>
<td>S.D</td>
</tr>
<tr>
<td>3.008</td>
<td>1.768</td>
<td>3.393</td>
<td>1.905</td>
<td>2.905</td>
</tr>
<tr>
<td>FT4 (ng/dl)</td>
<td>0.957</td>
<td>0.156</td>
<td>1.272</td>
<td>0.348</td>
</tr>
<tr>
<td>FT3 (pg/ml)</td>
<td>2.82</td>
<td>1.04</td>
<td>2.76</td>
<td>0.93</td>
</tr>
</tbody>
</table>

Table 3. Correlations between variables in hypertension patients group (r value).

<table>
<thead>
<tr>
<th>Variable</th>
<th>T.C</th>
<th>T.G</th>
<th>HDL</th>
<th>LDL</th>
<th>VLDL</th>
<th>TSH</th>
<th>FT4</th>
<th>FT3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.C</td>
<td>1</td>
<td>0.164</td>
<td>0.102</td>
<td>0.833</td>
<td>0.164</td>
<td>0.77</td>
<td>0.068</td>
<td>0.116</td>
</tr>
<tr>
<td>T.G</td>
<td>0.164</td>
<td>1</td>
<td>0.007</td>
<td>0.228</td>
<td>1.000</td>
<td>0.158</td>
<td>0.130</td>
<td>0.286</td>
</tr>
<tr>
<td>HDL</td>
<td>0.102</td>
<td>0.007</td>
<td>1</td>
<td>0.301</td>
<td>0.006</td>
<td>0.298</td>
<td>0.153</td>
<td>0.025</td>
</tr>
<tr>
<td>LDL</td>
<td>0.833</td>
<td>0.228</td>
<td>0.301</td>
<td>1</td>
<td>0.299</td>
<td>0.245</td>
<td>0.043</td>
<td>0.008</td>
</tr>
<tr>
<td>VLDL</td>
<td>0.164</td>
<td>1.000</td>
<td>0.006</td>
<td>0.229</td>
<td>1</td>
<td>0.166</td>
<td>0.130</td>
<td>0.289</td>
</tr>
<tr>
<td>TSH</td>
<td>0.077</td>
<td>0.158</td>
<td>0.298</td>
<td>0.245</td>
<td>0.166</td>
<td>1</td>
<td>0.302</td>
<td>0.088</td>
</tr>
<tr>
<td>FT4</td>
<td>0.068</td>
<td>0.130</td>
<td>0.153</td>
<td>0.043</td>
<td>0.130</td>
<td>0.332</td>
<td>1</td>
<td>0.303</td>
</tr>
<tr>
<td>FT3</td>
<td>0.116</td>
<td>0.286</td>
<td>0.025</td>
<td>0.008</td>
<td>0.289</td>
<td>0.088</td>
<td>0.303</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4: Correlations between variables in hypotension patients group (r value).

<table>
<thead>
<tr>
<th>Variable</th>
<th>T.C</th>
<th>T.G</th>
<th>HDL</th>
<th>LDL</th>
<th>VLDL</th>
<th>TSH</th>
<th>FT4</th>
<th>FT3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.C</td>
<td>1</td>
<td>0.580</td>
<td>0.239</td>
<td>0.970</td>
<td>0.581</td>
<td>0.317</td>
<td>0.223</td>
<td>0.094</td>
</tr>
<tr>
<td>T.G</td>
<td>0.580</td>
<td>1</td>
<td>0.251</td>
<td>0.435</td>
<td>1.000</td>
<td>0.129</td>
<td>0.183</td>
<td>0.305</td>
</tr>
<tr>
<td>HDL</td>
<td>0.239</td>
<td>0.251</td>
<td>1</td>
<td>0.149</td>
<td>0.250</td>
<td>0.106</td>
<td>0.078</td>
<td>0.124</td>
</tr>
<tr>
<td>LDL</td>
<td>0.970</td>
<td>0.435</td>
<td>0.149</td>
<td>1</td>
<td>0.435</td>
<td>0.318</td>
<td>0.228</td>
<td>0.012</td>
</tr>
<tr>
<td>VLDL</td>
<td>0.581</td>
<td>1.000</td>
<td>0.250</td>
<td>0.435</td>
<td>1</td>
<td>0.131</td>
<td>0.185</td>
<td>0.304</td>
</tr>
<tr>
<td>TSH</td>
<td>0.317</td>
<td>0.129</td>
<td>0.106</td>
<td>0.318</td>
<td>0.131</td>
<td>1</td>
<td>0.360</td>
<td>0.337</td>
</tr>
<tr>
<td>FT4</td>
<td>0.223</td>
<td>0.183</td>
<td>0.078</td>
<td>0.228</td>
<td>0.185</td>
<td>0.630</td>
<td>1</td>
<td>0.379</td>
</tr>
<tr>
<td>FT3</td>
<td>0.094</td>
<td>0.305</td>
<td>0.124</td>
<td>0.012</td>
<td>0.304</td>
<td>0.337</td>
<td>0.379</td>
<td>1</td>
</tr>
</tbody>
</table>

**Conclusion**

Although valuable information is available about blood pressure disorders, its association with thyroid disorders remains unclear. The current study did not show a clear association between TSH and FT3 levels and high blood pressure. The results obtained show that the level of FT4 of healthy subjects is hardly affected relative to those in hypotension patients giving a positive indication of the presence of a significant association...
between this hormone and blood pressure. More studies are recommended to understand the mechanism of the relationship between thyroid hormones and blood pressure. Moreover, the current study suggests that biochemical distortions in lipid profile (especially cholesterol, HDL and VLDL) are clearly associated with BP disorders. Furthermore, from Pearson’s correlation analysis we can conclude that there is no association between thyroid hormones and lipid profile. More importantly, the current study confirms that serum cholesterol, HDL and VLDL may be useful in identifying patients at risk of hypertension because they are useful tests that provide important diagnostic information.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Chemistry, College of Science, Mustansiriyyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

References
12. Otvos JD, Collins D, Freedman DS, Shalaurova I, Schaefer EJ. Low-density lipoprotein and high-density lipoprotein particle subclasses predict coronary events and are favorably changed by gemfibrozil therapy in the Veterans Affairs High-Density Lipoprotein Intervention Trial. Circulation. 2006;113(12): 1556-1563.


Hemodialysis Nurses’ Practices toward Hand Hygiene Performance at Baghdad Teaching Hospitals

Serwan J. Bakey
Adult Nursing Department, College of Nursing / University of Baghdad / Iraq

Abstract
A descriptive study was carried out in order to achieve the early stated objectives. The study was initiated from December 17th, 2017 through May 7th, 2018. A purposive (non-probability) sample of (35) nurses who have been working in hemodialysis units were selected to evaluate their practices toward hand hygiene performance at hemodialysis units in Baghdad teaching hospitals. The data collection process has been performed from March 20th, 2018 until the April 15th, 2018 by observation technique. The nurses’ practice form of the questionnaire was derived from the standard of hand hygiene which was developed by the World Health Organization’s and Centers for Disease Control and Prevention in 2009. Results of the present study revealed that the nurses have high performance of hand hygiene after exposure to body fluid (such as blood). Moreover, nurses use alcohol hand rubs instead of hand washing in delivering care for clients. While, the study revealed that hemodialysis nurses were presented with low performance with other parameters of hand hygiene standards. The study also presented that there was no significant relationship between hemodialysis nurses’ practices toward hand hygiene performance and their demographic characteristics.

Keywords: Evaluation, Nurses practice, Hand hygiene, Hemodialysis.

Introduction
Hospital acquired infections (HAIs) are among the most critical health problems that threaten patients’ lives. HAIs could cause health problems, such as death. Approximately 1.4 million people injure with HAIs, which cause 80,000 deaths in the United States of America (USA). One in every 25 patients is injured by HAIs. HAIs are usually transmitted among patients and healthcare workers through the hands of healthcare providers. Healthcare providers should consider the impact of infection on patients’ lives and should have the appropriate competencies to prevent cross contaminations among patients and themselves. World Health Organization (WHO, 2009) stated that all health care providers should perform hand hygiene before touching a patient, before clean/aseptic procedure, after body fluid exposure risk, after touching a patient, and after touching patients’ surroundings. The program of hand hygiene followed in The Mount Sinai Hospital in New York City depends on continuous education of the healthcare team, the availability of alcohol-based hand rub, the use of illustrated hand hygiene posters, continuous research protocol about hand hygiene, evaluating the application of hand hygiene and provide feedback, and a formal audit. Hand hygiene is the most effective procedure in infection control protocol that has been used to save the life of patients in all health care settings. Nurses, more than other health care team members in their contact with patients, play a major role in infection control and applying hand hygiene procedure to decrease the incidence of infection transmission. Foote (2014) stated that nurses are more likely to perform hand hygiene if they understand its concept and importance. Several published studies recommended to establish further studies to assess nurses’ practices toward infection control measures in hemodialysis units and to demonstrate the outbreaks that occur in HD units which are responsible for increasing

Corresponding Author:
Serwan J. Bakey
Adult Nursing Department, College of Nursing / University of Baghdad / Iraq;
E-mail: serwanj_81@yahoo.com
or- sjbakey@my.okcu.edu

incidence of infections between hemodialysis patients. All patients, who are admitted to a hospital, could contract any type of infectious diseases, which might threaten their lives or cause death. The Centers for Disease Control and Prevention stated that “at any given time, about 1 in every 20 patients has an infection related to their hospital care”. Infection injured approximately 722,000 patients in 2011, and it caused 75,000 deaths. Moreover, CDC (2015) reported that approximately half million people are infected by Clostridium Difficile infection every year, and it causes 29,000 deaths, annually. Healthcare workers are in contact with patients, especially nurses, and they should be aware about the standards of infection prevention and control. Hands of healthcare providers can be considered the most common way of infection transmission. Hand hygiene is the most effective procedure in preventing the spread of infection. The failure of applying hand hygiene procedure among healthcare workers is still a significant issue in healthcare settings. Healthcare providers can apply the simplest and cheapest strategy of infection prevention and control, which is hand hygiene.

**Material and Method**

A descriptive study was carried out in order to achieve the early stated objectives. The study was initiated from December 17th, 2017 through May 7th, 2018. An approval was issued from the Iraqi Ministry of Health. The study has been conducted on the Nursing staff who are working in Hemodialysis Units at AL-Yarmouk Teaching Hospital (11 nurses), AL-Kindy Teaching Hospital (12 nurses), and Baghdad Teaching Hospital (12 nurses) in Baghdad city. A purposive (non-probability) sample of (35) nurses who have been working in hemodialysis units were selected. The samples have been selected based on the following criteria:

1. Those who have been working in hemodialysis units.
2. Those that should have one year or more of experience in hemodialysis.
3. Those who are (21) years of age and older.

The data have been collected through the use of a questionnaire and by means of an interview technique and direct observation of the nurses who work in hemodialysis units (the study sample). The data collection process has been performed from March 20th, 2018 until the April 15th, 2018. Each nurse spends approximately a complete shift to document the response. The researcher used a modified questionnaire based on the standards of the hand hygiene which was developed by the WHO and CDC in 2009. The questionnaire consisted of 2 parts. A demographic Data Form; which consisted of (9) items, including gender, age, marital status, level of education, years of experience in hospital, years of experience in hemodialysis units, sharing in training sessions concerned to hemodialysis which established by the hospital, sharing in training sessions concerned to hemodialysis which established by other hospitals, sharing in training sessions related to hand hygiene which established within health institution, and duration of training sessions. Nurses’ practice form; which was comprised of (24) items that concerned with measuring nurses’ practice toward hand hygiene in hemodialysis unit at Baghdad teaching hospitals. Rating and Scoring of the items have been measured according to the following patterns:

Two-point Likert scale is used for rating the items as Yes and No.

The two-point type Likert scale is scored as 2 for Yes, and 1 for No.

The higher grade scoring of the questionnaire (MS) the greater Practice throughout hemodialysis treatment for patients in hemodialysis unit. Nurses with score from 1 – to – 1.24 have low practice toward hand hygiene performance; while, nurses with score from 1.25 – to – 1.75 have moderate practice, and nurses with score from 1.76 – to – 2 have higher practice. Content validity for the early developed instrument was determined through the use of panel of experts (who have had more than 5 years of experience in the job field) to investigate the clarity, relevancy, and adequacy of the questionnaire in order to achieve the present study’s objectives. Determination of reliability of the questionnaire was based on the test-retest method. The formula used for reliability was $r = 0.82$, and reliability is significant at P-value $\leq 0.01$.

**Results and Discussion**

Table (1) presented that the majority of the study sample (54.3%) were female and the remaining were male. Most of them were (21-25) years old and accounted for (57.1%). Moreover, the majority of the sample were married, and they accounted for (57.1%) of the whole
The greater number of the study sample were nursing college graduate and they accounted for (48.6%). Concerning number of years of experience, the majority of the sample (48.6%) having 1-5 years of experience in hospitals; while, (62.9%) having 1-5 years of experience in hemodialysis units. A large proportion of the study sample (42.9%) were sharing in training session which established by the hospital and (37.1%) of them were sharing in training session which established by other hospitals. Most of the study sample (62.9%) were not sharing in training sessions concerning hand hygiene which established by other institutes, and (91.4%) were not sharing in any training session regarding hand hygiene policy in hemodialysis units. Table (2) presented the total score of nurses who work at hemodialysis units concerning hand hygiene performance. It reflected that the majority of the study sample (91.4%) had low practice about hand hygiene performance. Table (3) presented the correlation between demographic characteristics and total score of the hand hygiene performance. It showed that there was no significant relationship (at p value equal or less than 0.05) between nurses’ demographic characteristics and their total score of hand hygiene performance. Table (4) presented the performance of nurses toward standards of hand hygiene at hemodialysis units. The results on table four referred that hemodialysis nurses have high performance of hand hygiene after exposure to body fluid (such as blood). Moreover, nurses use alcohol hand rubs instead of hand washing in delivering care for clients. While, the study revealed that hemodialysis nurses were presented with low performance with other parameters of hand hygiene standards. The findings of the study showed that more than half of nurses who work at hemodialysis units were young female nurses with bachelor’s degree in nursing. Moreover, this study revealed that the majority of nurses have one to five years of experiences in hospital units including hemodialysis units. In addition, most of nurses were not sharing in any training sessions inside or outside the healthcare setting where they work. Sharing in continuing education program has its dramatical impact on improving the compliance of nurses toward hand hygiene performance focusing on hand washing.

Table (1): Distribution of The Study Sample by Socio- Demographics (N= 35 nurses)

<table>
<thead>
<tr>
<th>Gender</th>
<th>F</th>
<th>%</th>
<th>Sharing in training sessions concerned to hand hygiene which established by the hospital</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>19</td>
<td>54.3</td>
<td>Yes</td>
<td>15</td>
<td>42.9</td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>45.7</td>
<td>No</td>
<td>20</td>
<td>57.1</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
<tr>
<td>Age</td>
<td>F</td>
<td>%</td>
<td>Sharing in training sessions concerned to hand hygiene which established by other hospitals</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>21-25</td>
<td>20</td>
<td>57.1</td>
<td>Yes</td>
<td>13</td>
<td>37.1</td>
</tr>
<tr>
<td>26-30</td>
<td>9</td>
<td>25.7</td>
<td>No</td>
<td>22</td>
<td>62.9</td>
</tr>
<tr>
<td>31-35</td>
<td>6</td>
<td>17.1</td>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
<tr>
<td>36-40</td>
<td>0</td>
<td>0</td>
<td>Sharing in training sessions concerned to hand hygiene which established by other institutions</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>41-45</td>
<td>0</td>
<td>0</td>
<td>Outside the country</td>
<td>18</td>
<td>51.4</td>
</tr>
<tr>
<td>46 &amp; more</td>
<td>0</td>
<td>0</td>
<td>Inside the country</td>
<td>17</td>
<td>48.6</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
<td>Not sharing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Marital status</td>
<td>F</td>
<td>%</td>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
</tbody>
</table>
## Table (1): Distribution of The Study Sample by Socio-Demographics (N= 35 nurses)

<table>
<thead>
<tr>
<th>married</th>
<th>20</th>
<th>57.1</th>
<th>Duration of the training session</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>15</td>
<td>42.9</td>
<td>Not sharing</td>
<td>32</td>
<td>91.4</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
<td>Less than one month</td>
<td>3</td>
<td>8.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of education</th>
<th>F</th>
<th>%</th>
<th>One month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing School</td>
<td></td>
<td></td>
<td>Two months</td>
</tr>
<tr>
<td>Secondary nursing school graduate</td>
<td>4</td>
<td>11.4</td>
<td>Six months</td>
</tr>
<tr>
<td>Nursing institute graduate</td>
<td>14</td>
<td>40.0</td>
<td>Total 35 100.0</td>
</tr>
<tr>
<td>Nursing college graduate</td>
<td>17</td>
<td>48.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of years of experience in hospitals</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>17</td>
<td>48.6</td>
</tr>
<tr>
<td>6-10</td>
<td>11</td>
<td>31.4</td>
</tr>
<tr>
<td>11-15</td>
<td>7</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
</tbody>
</table>

## Table (2). Total Score of Nurses with Hand Hygiene Performance at Hemodialysis Units

<table>
<thead>
<tr>
<th>Description</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Score</td>
<td>32</td>
<td>91.4</td>
</tr>
<tr>
<td>Moderate Score</td>
<td>3</td>
<td>8.6</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
</tbody>
</table>

## Table (3). Relationship between Nurses’ Demographic Characteristics and their total score of Hand Hygiene Performance.

<table>
<thead>
<tr>
<th>Variables</th>
<th>gender</th>
<th>education level</th>
<th>Years of experience in hemodialysis unit</th>
<th>Years of experience in hospital</th>
<th>Sharing in training session in hospital</th>
<th>Total score of Hand Hygiene Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>gender</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.481**</td>
<td>.342*</td>
<td>.337*</td>
<td>.363*</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.003</td>
<td>.044</td>
<td>.048</td>
<td>.032</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>age</td>
<td>Pearson Correlation</td>
<td>.481**</td>
<td>1</td>
<td>.286</td>
<td>.867**</td>
<td>.713**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.003</td>
<td>.095</td>
<td>.000</td>
<td>.000</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>
### Table (3). Relationship between Nurses’ Demographic Characteristics and their total score of Hand Hygiene Performance.

<table>
<thead>
<tr>
<th></th>
<th>Pearson Correlation</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.342*</td>
<td>.044</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.286</td>
<td>.095</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.930</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.015</td>
<td>.932</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.015</td>
<td>.090</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.291</td>
<td>.698</td>
<td>35</td>
</tr>
<tr>
<td><strong>Years of experience in hospital</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.337*</td>
<td>.048</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.867**</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.015</td>
<td>.930</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.739**</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.318</td>
<td>.062</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.099</td>
<td>.571</td>
<td>35</td>
</tr>
<tr>
<td><strong>Years of experience in hemodialysis unit</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.363*</td>
<td>.032</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.713**</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.015</td>
<td>.932</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.739**</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.001</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.529**</td>
<td>.090</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.090</td>
<td>.606</td>
<td>35</td>
</tr>
<tr>
<td><strong>Sharing in training session in hospital</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.596**</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.529**</td>
<td>.001</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.291</td>
<td>.090</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.318</td>
<td>.062</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.529**</td>
<td>.001</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.767</td>
<td>35</td>
</tr>
<tr>
<td><strong>Total score of Hand Hygiene Practice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.211</td>
<td>.000</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.047</td>
<td>.001</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>.068</td>
<td>.090</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.099</td>
<td>.052</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.090</td>
<td>1</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>-.052</td>
<td>1</td>
<td>35</td>
</tr>
</tbody>
</table>

Table (4): Nurses’ practice within three-point level scale by total frequencies, mean score and comparative significant of the first, second, and third observation.

<table>
<thead>
<tr>
<th>Items</th>
<th>M.S. 1&lt;sup&gt;st&lt;/sup&gt; Obs.*</th>
<th>M.S. 2&lt;sup&gt;nd&lt;/sup&gt; Obs.**</th>
<th>M.S. 3&lt;sup&gt;rd&lt;/sup&gt; Obs.***</th>
<th>Total M.S.</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Before touching a patient</td>
<td>1.5</td>
<td>1.6</td>
<td>1.54</td>
<td>1.54</td>
<td>M</td>
</tr>
<tr>
<td>2 Before clean/aseptic procedure</td>
<td>1.2</td>
<td>1.11</td>
<td>1.17</td>
<td>1.16</td>
<td>L</td>
</tr>
<tr>
<td>3 After body fluid exposure risk (Handling blood samples and other specimens)</td>
<td>1.82</td>
<td>1.8</td>
<td>1.82</td>
<td>1.81</td>
<td>H</td>
</tr>
<tr>
<td>4 After touching a patient</td>
<td>1.31</td>
<td>1.25</td>
<td>1.28</td>
<td>1.28</td>
<td>M</td>
</tr>
<tr>
<td>5 After touching patient surroundings</td>
<td>1.11</td>
<td>1.17</td>
<td>1.2</td>
<td>1.16</td>
<td>L</td>
</tr>
<tr>
<td>6 Before wearing gloves</td>
<td>1.11</td>
<td>1.2</td>
<td>1.28</td>
<td>1.19</td>
<td>L</td>
</tr>
<tr>
<td>7 After gloves removal</td>
<td>1.57</td>
<td>1.48</td>
<td>1.51</td>
<td>1.52</td>
<td>M</td>
</tr>
<tr>
<td>8 Before exiting the patient’s care area</td>
<td>1.31</td>
<td>1.25</td>
<td>1.28</td>
<td>1.28</td>
<td>M</td>
</tr>
<tr>
<td>9 Preparing/administering medications</td>
<td>1.14</td>
<td>1.11</td>
<td>1.2</td>
<td>1.15</td>
<td>L</td>
</tr>
<tr>
<td>10 Measuring vital signs/weighing</td>
<td>1</td>
<td>1.11</td>
<td>1</td>
<td>1.03</td>
<td>L</td>
</tr>
</tbody>
</table>
Cont.. Table (4): Nurses’ practice within three-point level scale by total frequencies, mean score and comparative significant of the first, second, and third observation.

<table>
<thead>
<tr>
<th></th>
<th>Preparing trolley/tray for cannulation/ catheter dressing/ dialysis disconnection</th>
<th>1.37</th>
<th>1.31</th>
<th>1.28</th>
<th>1.32</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Palpating clean cannulation sites</td>
<td>1.25</td>
<td>1.28</td>
<td>1.17</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Skin preparation &amp; cannulation of arteriovenous access</td>
<td>1.45</td>
<td>1.42</td>
<td>1.42</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Catheter exit site dressing</td>
<td>1.68</td>
<td>1.71</td>
<td>1.74</td>
<td>1.71</td>
<td>M</td>
</tr>
<tr>
<td>14</td>
<td>Connection for HD</td>
<td>1.05</td>
<td>1.02</td>
<td>1.08</td>
<td>1.05</td>
<td>L</td>
</tr>
</tbody>
</table>

**Conclusions**

More than half of nurses were young females, with bachelor’s degree in nursing. More than half of the study sample have one to five years of experience in hospital and hemodialysis unit. More than half of nurses were not sharing in training session in hand hygiene established by hospital and by other hospitals. Most of study sample were within low practice toward hand hygiene performance in hemodialysis units. No significant relationships were found between demographic characteristics and nurses’ performance toward hand hygiene practices.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Adult Nursing Department, College of Nursing / University of Baghdad / Iraq and all experiments were carried out in accordance with approved guidelines.

**References**


Intrauterine Growth Restriction is Frequent Obstetric Problem in Mid-Euphrates Region of Iraq: a Case Control Study

Suad Abdulzahra Mutar
Gynecology specialist / Al-Diwaniyah Child and Maternity Hospital / Department of Obstetrics and gynecology / Al-Diwania / Iraq

Abstract

One of the common obstetric conditions in clinical practice is the problem of fetal growth restriction (FGR) which a main cause of mortality and morbidity during perinatal period. The incidence of fetal growth restriction also follow geographic variation since Asian countries account for more than 70% of cases followed by Latin American and African continents. Aim of the study: to make insight on the problem of intrauterine fetal growth restriction in terms of causes, risk factors and outcome in Al-Diwaniyah province in the Mid-Euphrates region of Iraq. The most common risk factor was anemia which was seen 12 (31.6 %) followed by pre-eclampsia, detected in 10 (26.3 %) and then by malnutrition, diagnosed in 6 (15.8 %). Other risk factors included cardiopulmonary disease, smoking and gestation diabetes mellitus, each seen in 2 cases only. The problem of fetal growth restriction is common in clinical practice in the region of Mid-Euphrates region of Iraq with late onset diagnosis and mainly associated with anemia, hypertension and severe eclampsia

Keywords: Fetal growth restriction, Mid-Euphrates region, Iraq

Introduction

One of the common obstetric conditions in clinical practice is the problem of fetal growth restriction (FGR) which a main cause of mortality and morbidity during perinatal period. Fetal growth restriction is of two main types according to gestational age, early onset and late onset subtypes. Early onset subtype is usually detected before 32 weeks gestation and differs from late onset subtype in several aspects such as severity of placental dysfunction, mode of deterioration, association with hypertension and clinical manifestation. The list of causes of fetal growth restriction is relatively long and included heterogeneous conditions that can be categorized as maternal, fetal, placental and environmental; however, fetal growth restriction may be described as placental mediated one and non-placental mediated one. Maternal causes include disorders that affect placental function such as chronic hypertension, gestational hypertension, pre-eclampsia, autoimmune disorders, vasculitis and diabetes in addition to disorders that are associated with hypoxemia such as hematological, respiratory and cardiac disorders. Fetal causes include genetic and chromosomal abnormalities, structural defects, inborn error of metabolism and congenital infections. Several other risk factors have been blamed including smoking, alcoholism, age more than 35 years, nulliparity and twin pregnancies. The definition of fetal growth restriction has been a matter of debate since no single definition is widely accepted. “The American College of Obstetricians and Gynecologists (ACOG) defines FGR as an estimated fetal weight less than the 10th centile.” The Royal College of Obstetricians and Gynaecologists (RCOG) uses fetal abdominal circumference (AC) or estimated fetal weight (EFW) <10th centile to diagnose a FGR fetus.” Other Authors have suggested a cut off of the 3rd centile to detect pregnancies at higher risk of adverse outcomes. The incidence rate of fetal growth restriction is substantially higher in developing countries in comparison to that in developed nations; furthermore the incidence rate is much higher in countries with low to middle income because many children are delivered in home with no antenatal records. The incidence of fetal growth restriction also follow geographic variation since...
Asian countries account for more than 70% of cases followed by Latin American and African continents. The present study was carried out in order to make insight on the problem of intrauterine fetal growth restriction in terms of causes, risk factors and outcome in Al-Diwaniyah province in the Mid-Euphrates region of Iraq.

**Methodology**

The present case control study was carried out in Al-Diwaniyah child and maternity hospital, Al-Diwaniyah province, Iraq. The study started on January 2017 and ended on February 2018. The study included two groups, a control group and a study group. The study group included 38 women with intrauterine fetal growth restriction diagnosed based on clinical and ultrasound findings. The control group included 48 women with apparently normal pregnancy with comparable gestational age. Assessment of amniotic fluid volume and placental blood flow was carried out using conventional and color Doppler ultrasound examinations, respectively. Ethical approval was obtained from the Ethical approval committee of the college of medicine / University of Al-Qadisiyah. Verbal consent were obtained from each women enrolled in the current study after full explanation of the aim and the procedures of the present study. Statistical analysis was carried out using SPSS version 23 statistical software and Microsoft Office excel. Data were expressed as number, percentage, mean, standard deviation and range. Independent samples t-test was used to evaluate difference in mean values between both groups, whereas, chi-square and or Fischer exact tests were used to study associations between categorical variables.

**Results and Discussion**

In this cases control study, the mean age of women in the study group was 28.63 ± 5.84 years and that of control group was 28.25 ± 5.82 years. There was no significant difference in mean age between the two enrolled groups (P = 0.764), as shown in table 1. Neither study group nor control group included women older than 35. We tried to select members, to be involved in the control group, in such a way that the gestational age in both groups is comparable. Therefore we obtained a control group with mean gestational age having insignificant difference in comparison with that of study group, 33.88 ± 1.85 years versus 33.63 ± 1.78 years, respectively and the level of significance was 0.539, as shown in table 2. In most cases of intrauterine fetal growth restriction the diagnosis was made after 32 weeks gestation (late onset) accounting for 34 out of 38 (89.5 %), whereas early onset fetal growth restriction was detected in 4 cases only (10.5 %), as shown in table 2. Findings of color Doppler ultrasound examination are shown in table 3. Findings were categorized into three major categories, oligohydramnios, absent end diastolic flow (EDF) and reverse end diastolic flow. In most cases the main finding was oligohydramnios which was seen in 24 cases (63.2 %) followed by absent EDF, recognized in 18 (47.4 %) women and then finally by reverse EDF, detected in 6 (15.8 %) of women. Color Doppler ultrasound examination revealed normal blood flow pattern in all women included within the control group, as shown in table 3. Possible risk factors of intrauterine fetal growth restriction were presented in table 4. The most common risk factor was anemia which was seen 12 (31.6 %) followed by pre-eclampsia, detected in 10 (26.3 %) and then by malnutrition, diagnosed in 6 (15.8 %). Other risk factors included cardiopulmonary disease, smoking and gestation diabetes mellitus, each seen in 2 cases only. Women enrolled in the control group had none of the above mentioned risk factors. The main objective of the current study was to highlight the problem of intrauterine fetal growth restriction and to identify main causes and risk factors since great geographical variation in the causes and risk factors of fetal growth restriction is described in the pool of available published literatures. Here in Al-Diwaniyah province (Mid-Euphrates region of Iraq), we found that the main associations in terms of pathophysiology are either oligohydramnios or placental blood flow inadequacy. Therefore the causes of oligohydramnios should be recognized and treated as early possible in order to avoid the outcome of fetal growth restriction. In addition causes of placental blood flow restriction such pre-eclampsia (PE), anemia, malnutrition and gestational diabetes should be treated adequately and promptly. In this study, unfortunately the diagnosis of fetal growth restriction is late in the majority reflecting poor antenatal care and or underdiagnosis of the problem early during pregnancy. Therefore, it is recommended to bring the attention of heath care workers in the field of obstetric to the size of this problem that is the fetal growth restriction, in terms of child morbidity and mortality and possible ways to reduce the incidence rate of this problem. As we said previously, oligohydramnios was the main finding during ultrasound examination of women.
with intrauterine fetal growth restriction. Amniotic fluid volume evaluation is a routine aspect of ultrasound examination during pregnancy. Oligohydramnios is accompanied by small babies for gestational age and perinatal death, even though its predictive role for individual risk for the outcome is not good. Therefore, Amniotic fluid volume assessment should not be regarded as the only way of detecting intrauterine growth restriction. Nevertheless, in addition to Doppler examination or as an element of biophysical profiles, it may offer more clinically acceptable information on fetal status. Amniotic fluid volume assessment can be done by objective (single deepest pocket and amniotic fluid index) and or subjective (based on the doctor’s visual inspection) methods. It is advised to estimate amniotic fluid volume objectively when either subjective ways suggest reduced volume or in women with higher risk of fetal growth restriction. The main risk factors identified in this study were anemia, pre-eclampsia and chronic hypertension. Importantly, anemia during pregnancy has a number of effects on fetal growth. It is a well recognized fact that there is a physiological decline in the level of hemoglobin in the mid-trimester. This physiological decline is due to rise in volume of plasma, and hence reduction in blood viscosity. This helps in better circulation throughout the placenta. The lowest hemoglobin value of this decline is variable, and therefore the criteria for detecting anemia in pregnancy should be defined strictly. Anemia during pregnancy, according to WHO, has been defined as hemoglobin level of less than 11 g/dl during pregnancy. Anemia in pregnant ladies has been considered as detrimental to the fetal growth. Preterm labor and Low birth weight have been frequently linked to anemia during pregnancy. A lot of studies have been carried out during the last decades aiming at exploring the role of anemia in pregnancy and iron on the growing fetus; however, the results of these studies were either inconclusive or supportive of the previous notions held so far about anemia and pregnancy outcome. Chronic hypertension and severe pre-eclampsia were also recognized in the current study as risk factors in association with fetal growth restriction. This finding has been established in previous studies. In conclusion, the problem of fetal growth restriction is common in clinical practice in the region of Mid-Euphrates region of Iraq with late onset diagnosis and mainly associated with anemia, hypertension and severe eclampsia.

Table 1: Maternal age in control and study groups

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Control group n = 48</th>
<th>Study group n = 38</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>28.25 (5.82)</td>
<td>28.63 (5.84)</td>
<td>0.764 *</td>
</tr>
<tr>
<td>Range</td>
<td>20 - 35</td>
<td>19 - 35</td>
<td>NS</td>
</tr>
<tr>
<td>≤ 35 years</td>
<td>48 (100 %)</td>
<td>38 (100 %)</td>
<td></td>
</tr>
<tr>
<td>&gt; 35 years</td>
<td>0 (0 %)</td>
<td>0 (0 %)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Gestational age in control and study group

<table>
<thead>
<tr>
<th>Gestational age (weeks)</th>
<th>Control group n = 48</th>
<th>Study group n = 38</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>33.88 (1.85)</td>
<td>33.63 (1.78)</td>
<td>0.539 *</td>
</tr>
<tr>
<td>Range</td>
<td>30 - 36</td>
<td>30 - 36</td>
<td>NS</td>
</tr>
<tr>
<td>&lt; 32 years</td>
<td>6 (12.5 %)</td>
<td>4 (10.5 %)</td>
<td>1.000 †</td>
</tr>
<tr>
<td>≥ 32 years</td>
<td>42 (87.5 %)</td>
<td>34 (89.5 %)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Doppler ultrasound findings in control and study groups

<table>
<thead>
<tr>
<th>Doppler US findings</th>
<th>Control group n = 48</th>
<th>Study group n = 38</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oligohydramnios</td>
<td>0 (0 %)</td>
<td>24 (63.2 %)</td>
<td>&lt;0.001* HS</td>
</tr>
<tr>
<td>Absent EDF</td>
<td>0 (0 %)</td>
<td>18 (47.4 %)</td>
<td>&lt;0.001* HS</td>
</tr>
<tr>
<td>Reverse EDF</td>
<td>0 (0 %)</td>
<td>6 (15.8 %)</td>
<td>0.006 † HS</td>
</tr>
</tbody>
</table>
Table 4: Risk factors in control and study groups

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Control group n = 48</th>
<th>Study group n = 38</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>0 (0 %)</td>
<td>10 (26.3 %)</td>
<td>&lt;0.001†</td>
</tr>
<tr>
<td>Anemia</td>
<td>0 (0 %)</td>
<td>12 (31.6 %)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Chronic hypertension</td>
<td>0 (0 %)</td>
<td>4 (10.5 %)</td>
<td>0.035†</td>
</tr>
<tr>
<td>Cardiopulmonary disease</td>
<td>0 (0 %)</td>
<td>2 (5.3 %)</td>
<td>0.191†</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>0 (0 %)</td>
<td>6 (15.8 %)</td>
<td>0.006†</td>
</tr>
<tr>
<td>Smoking</td>
<td>0 (0 %)</td>
<td>2 (5.3 %)</td>
<td>0.191†</td>
</tr>
<tr>
<td>Gestational DM</td>
<td>0 (0 %)</td>
<td>2 (5.3 %)</td>
<td>0.191†</td>
</tr>
</tbody>
</table>

**Conclusion**

The most common risk factor was anemia which was seen 12 (31.6 %) followed by pre-eclampsia, detected in 10 (26.3 %) and then by malnutrition, diagnosed in 6 (15.8 %). Other risk factors included cardiopulmonary disease, smoking and gestation diabetes mellitus, each seen in 2 cases only. The problem of fetal growth restriction is common in clinical practice in the region of Mid-Euphrates region of Iraq with late onset diagnosis and mainly associated with anemia, hypertension and severe eclampsia.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Al-Diwaniyah child and maternity hospital / Department of Obstetrics and gynecology / Al-Diwania / Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

12. Shah PS. Knowledge Synthesis Group on Determinants of 45. LBW/PT Births. Parity and


Investigating of Geriatric Depression among Elderly in Nasiriyah City

Hussein Jassim¹, Alaa M Tuama¹, Hassan Alwan¹
¹College Nursing, University of Babylon, Iraq

Abstract

As the world’s population ages, depression has been highlighted as a global public health concern and a significant risk factor for morbidity and mortality among older adults. Objective: To Investigating of Geriatric Depression among elderly in Nasiriyah City A descriptive cross-sectional study was conducted at the community based population, A purposive “non-probability” sample of (300) participants who were selected from the community based population, health care center, key card offices and Geriatric Homes in Thi-Qar for the period from February 15th 2018 to April 26th of 2018. The study results have indicated that more than half of participants are within 65-74 years-old (n=209; 69.7%), their gender is approximate; (n=155; 51.7%) for male; more than half of them are Illiterate (n=165; 55.0%); more than a third of the elderly are occupying Housewife and Retired equally (n=118; 39.3%), the majority of them live in urban areas (n=219; 73.0%); less than half of them report that their monthly income is Enough (n=131; 43.7%) , The result reveals that more than third of participant has a Suggestion depression (n=114; 38%), in contrast to the less than quarter of participants who have Indicative depression (n=73; 24.3%).

Keywords: Investigating; Geriatric; Depression.

Introduction

Elderly population is increasing larger than ever before, with the expansion majority surviving beyond the age of 65. The U.S. population elderly than age 65 is expected to double from approximately 35 million in 2000 (13% of the total population) to 72 million in 2030 (20% of the population) ¹. Old age is a gradual, continuous process of natural change than begins in early adulthood. During early medium age, many bodily functions begin to gradually diminish. People do not become old or elderly at any specific age. Traditionally, age 65 has been designated as the beginning of old age. Many years ago, age 65 was chosen as the age for retirement in Germany ². Over the last twenty-five years, there has been a growing emphasis in the field of gerontology to examine issues related to diversity across racial and ethnic groups ³. The number of adults aged 65 and elderly is projected to rise to 72.1 million by 2030-up from 40.3 million in 2010 ⁴. Many people elderly than age 65 live happy and healthy independent lives. Some alterations in the ability to think are considered a normal part of the aging process. Most healthy elderly people experience mild decline in some areas of cognition. These changes may happen in the regions of visual and verbal memory, visuospatial abilities, immediate memory or the capability to name objects ⁵. Research indicates that age-related changes in the mined such as reduced hippocampal, frontal and temporal lobe volumes can happen although, the extent to which these age-related changes contribute to cognitive decline has yet to be determined. Non-verbal memory weakness are also considered to be a recurrent cognitive deficit associated with aging. Control and maintenance of attentiveness and immediate memory can be affected in normally aging individual ⁶.

Methodology

A descriptive cross-sectional descriptive sample of 300 elderly people in the community, health care center, cardiology offices and geriatrics was conducted in Thi-Qar from November 11, 2017 to June 2018. The
inclusion criteria are met. A purposive sample is “Non-probability” of 300 elderly who were selected out from the above mentioned areas and the study sample meets the inclusion criteria, this means are subjects chosen according to specific criteria. The present study is conducted in Thi-Qar Governorate; at the community based population, key card offices, health care center and Geriatric Homes in Thi-Qar.

**Administrative Arrangements**

An official permission has been obtained from the Ministry of Planning / Central Statistical Organization (CSO) for the acceptance of the questionnaire draft. Another approval was obtained from the Ministry of Health by a contract between College of Nursing, and initial agreements of the Ministry of Health/Directorate Health Thi-qar Governorate/ Training Center and Research Development (TCRD) , and Health care centers, As well as a formal permission was obtained from Ministry of Labor and Social affairs in order to collect the required data and interviewing each subjects Elderly.

**Data Collection and Instrument**

Data were collected through using a questionnaire designed and developed for the purpose of the study the questionnaire has been constructed after extensive review of available literature and related studies. The study instrument consists of two parts. The first part includes participants’ demographic characteristics of age, gender, level of education,...ets. The second part is related to The Geriatric Depression Scale (GDS) it is a useful screening tool in the clinical setting to facilitate assessment of depression in older adults especially when baseline measurements are compared to subsequent scores. used to identify potential items for the study of instrument. It is adopted from The Hartford Institute for Geriatric Nursing, New York University, College of Nursing. Data were collected by the researcher are from elderly, those who were visits, key card offices, health care center, Geriatric Homes in Thi-Qar and the community based population at Thi-Qar Governorate through interview and by filling a questionnaire format. Reliability of the questionnaire is determined through pilot study “Cornbach’s alpha” which has been (0.85) as well as the validity determined through a panel of experts in the field. The demographic characteristic were obtained through a direct interview with each patients in the study using, adopting and developing questionnaire format. The data collection process had been performed from January( 28)th to February (8 )th 2018. A statistical analysis was performed using the Microsoft office excel 2007 and SPSS package (version 19). Chi- square statistics were used to determine the presence of an association between the variables. These were used to accept or reject the hypothesis , Which include the following :

1. The P. value indicates that the degree of significance was (P ≤ 0.05) to just significant result
2. **Cut-off-point:** 0 - 0.33 = Low; 0.34 - 0.67 = Moderate; 0.68 - 1 = High; H = High; M= Moderate; L = Low.
3. Statistical table (Frequencies & Percentages).

\[
\% = \frac{\sum F}{n} \times 100 \%
\]

**Results and Discussion**

Table (2) describes that more than half of participants are within 65-74 years-old (n=639; 68.7%), their gender is; (n=477; 51.3%) were male, and (n=453; 48.7%) were female, the male to female ratio is (1.1:1) more than half of them are Illiterate (n=519; 55.8%); more than one third of the elderly are occupying Housewife and Retired equally (n=367; 39.5, 361; 38.8 %) respectively, the majority of them live in urban areas (n = 678; 72.9%); less than half of them report that their monthly income is Enough (n=403; 43.3%). Results of the study are the current show in Table (1) was the highest percentage in the reconstruction study participants between the (65-74) age where up frequency 639 and percentage of 68.7,

A study conducted in Angelique Chan et,al showed that 64.8 %women were less than 30 years with age group (60_70) And Because this age group is the most active and vital of the other categories so it is easy to get them sample for research. The study percentage of males in equal with females because researchers have relied upon to be ratio close and gender we find that. The results referred to study sample to that 55.8% of illiterate and the percentage of recurrence was 519, this agree with the study in Boulos Christa1 et,al showed that frequency 350 were illiterate. Because the country was lacking
in education and the lack of educational institutions and the community was the cause of ignorance and scientific backwardness. With regard to the profession was more than half Posts participate are housewives where she was replicated 367 and increase of 39.5%, A study conducted in Mankikar, S. showed that 58% were housewife. And get the appointment the proportion of the men also retired 38.8% because the men in this period was working in institutions military so because the Iraqi society was in that period are working in agriculture and engage the careers military. And because it most of the samples participate are illiterate -with regard to logic housing in the study are from the city so that the Thus reducing the chance of getting a job. However, the results referred to study sample to that 72.9 % in urban and the percentage of recurrence was 678 this agree with the study in Marianne Baernholdt et.al showed that 73.83 %. Due to migration from rural to urban and industrial revolution and also places of study are located in city centers. Consistently less than half of them report that their monthly income is sufficient. This can be attributed that, most of those elderly are depend on others,. The Geriatric Depression symptom in Older Adults are Suggestion depression in severity for the more than third of participants. This result is consistent with the study of Richard, W. and Besdine, MD (2015) who have found that a study carried out by 60 adults aged 65 and over .38.25% of whom were depression. This can be attributed that the results due to several reasons Psychological and social reasons accumulate on the elderly living conditions experienced by the elderly of unity and lack of attention from others and their experiences of loss may have lost his wife and became lonely or lost most of his friends either by death or difficulty meeting them because of illness or illness or lost his job or loss of ability to Earning no longer has goals to achieve .It may be painful because of the boredom of the length of leisure time and not to engage in any work or hobbies, especially neglect his hobbies and activities that gives him happiness to engage in work in previous periods. The findings of the study indicated that there is a high significant relationship between depression levels and the age of elderly people. This study was compatible with (Mecheser, 2005) and (Boralingaiah et al., 2012) and (Abolfotouh et al., 2001) who found relationship between depression and age. The reason for this result is whenever advance of human age will suffer from increased anxiety due to which afraid vulnerability to physical disabilities and losing life, the experience of age and experiments acquired from the life which considered important to overcome depression. In regard, The study about educational level indicates that there is a high significant relationship between depression levels and educational level of elderly people. This study were compatible with Ramchandra and Salunkhe (2014) who found a relationship between depression and educational level. This can be attributed that the human who has learning, achievement and education were in the lowest level of anxiety from illiterate people because the educated person has the ability to understand the situation and deal with it correctly and the educational level were an indicator of vulnerability of elderly about psychological problems faced by (depression).
Table (1): Distribution of the participants Socio- Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-74</td>
<td>639</td>
<td>68.7</td>
</tr>
<tr>
<td>75-84</td>
<td>206</td>
<td>22.2</td>
</tr>
<tr>
<td>85 and above</td>
<td>85</td>
<td>9.1</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>477</td>
<td>51.3</td>
</tr>
<tr>
<td>female</td>
<td>453</td>
<td>48.7</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>519</td>
<td>55.8</td>
</tr>
<tr>
<td>Reading</td>
<td>186</td>
<td>20.0</td>
</tr>
<tr>
<td>Primary</td>
<td>91</td>
<td>9.8</td>
</tr>
<tr>
<td>Intermediate</td>
<td>42</td>
<td>4.5</td>
</tr>
<tr>
<td>Preparatory</td>
<td>52</td>
<td>5.6</td>
</tr>
<tr>
<td>University</td>
<td>40</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>367</td>
<td>39.5</td>
</tr>
<tr>
<td>Wage earner</td>
<td>70</td>
<td>7.5</td>
</tr>
<tr>
<td>Retired</td>
<td>361</td>
<td>38.8</td>
</tr>
<tr>
<td>Does not work</td>
<td>132</td>
<td>14.2</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
<tr>
<td><strong>Place of Resident</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>678</td>
<td>72.9</td>
</tr>
<tr>
<td>Rural</td>
<td>252</td>
<td>27.1</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
<tr>
<td><strong>Level of Monthly Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>403</td>
<td>43.3</td>
</tr>
<tr>
<td>Enough to some extent</td>
<td>375</td>
<td>40.3</td>
</tr>
<tr>
<td>Not enough</td>
<td>152</td>
<td>16.3</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
</tbody>
</table>
**Table (2): Description of Participants’ Assessing Nutrition in Older Adults**

<table>
<thead>
<tr>
<th>Items</th>
<th>F.</th>
<th>%</th>
<th>M.S</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is safe to say that you are essentially happy with your life?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>671</td>
<td>72.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>259</td>
<td>27.8</td>
<td>0.28</td>
<td>L</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Have you dropped a large number of your exercises and interests?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>550</td>
<td>59.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>380</td>
<td>40.9</td>
<td>0.59</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Do you feel that your life is vacant?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>372</td>
<td>40.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>558</td>
<td>60.0</td>
<td>0.40</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Do you frequently get exhausted?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>634</td>
<td>68.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>296</td>
<td>31.8</td>
<td>0.68</td>
<td>H</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. It is safe to say that you are in great spirits more often than not</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>518</td>
<td>55.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>412</td>
<td>44.3</td>
<td>0.44</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. It is safe to say that you are worried about the possibility that that something awful will transpire?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>578</td>
<td>62.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>352</td>
<td>37.8</td>
<td>0.62</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Do you feel cheerful more often than not?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>460</td>
<td>49.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>470</td>
<td>50.5</td>
<td>0.51</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Do you frequently feel vulnerable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>458</td>
<td>49.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>472</td>
<td>50.8</td>
<td>0.49</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Do you want to remain at home, instead of going out and doing new things?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>479</td>
<td>51.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>451</td>
<td>48.5</td>
<td>0.52</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Do you believe you have a bigger number of issues with memory than most?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>445</td>
<td>47.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>485</td>
<td>52.2</td>
<td>0.48</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table (3): Description of overall Geriatric Depression symptom in Older Adults

<table>
<thead>
<tr>
<th>Geriatric Depression symptom</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geriatric Depression symptoms</td>
<td>347</td>
<td>37.3</td>
</tr>
<tr>
<td>Suggestion depression</td>
<td>355</td>
<td>38.2</td>
</tr>
<tr>
<td>Indicative depression</td>
<td>228</td>
<td>24.5</td>
</tr>
<tr>
<td>Total</td>
<td>930</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table (4): Association between the geriatric depression symptom and their ages

<table>
<thead>
<tr>
<th>Depression Age</th>
<th>Normal</th>
<th>Suggestion depression</th>
<th>Indicative depression</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-74</td>
<td>249</td>
<td>245</td>
<td>145</td>
<td>639</td>
</tr>
<tr>
<td>75-84</td>
<td>63</td>
<td>71</td>
<td>72</td>
<td>206</td>
</tr>
<tr>
<td>85 and above</td>
<td>35</td>
<td>39</td>
<td>11</td>
<td>85</td>
</tr>
<tr>
<td>Total</td>
<td>347</td>
<td>355</td>
<td>228</td>
<td>930</td>
</tr>
</tbody>
</table>

\[ \chi^2_{\text{obs.}} = 20.042; \quad \chi^2_{\text{crit.}} = 9.488; \quad \text{df}= 4; \quad P \leq 0.05 \quad \text{HS} \]

### Table (5): Association between the geriatric depression symptoms and levels of education

<table>
<thead>
<tr>
<th>Depression Level of education</th>
<th>Normal</th>
<th>Suggestion depression</th>
<th>Indicative depression</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>197</td>
<td>204</td>
<td>118</td>
<td>519</td>
</tr>
<tr>
<td>Reading</td>
<td>60</td>
<td>74</td>
<td>52</td>
<td>186</td>
</tr>
<tr>
<td>Primary</td>
<td>36</td>
<td>37</td>
<td>18</td>
<td>91</td>
</tr>
<tr>
<td>Intermediate</td>
<td>18</td>
<td>18</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td>Preparatory</td>
<td>24</td>
<td>6</td>
<td>22</td>
<td>52</td>
</tr>
<tr>
<td>University</td>
<td>12</td>
<td>16</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>347</td>
<td>355</td>
<td>228</td>
<td>930</td>
</tr>
</tbody>
</table>

\[ \chi^2_{\text{obs.}} = 25.251; \quad \chi^2_{\text{crit.}} = 18.307; \quad \text{df}= 10; \quad P \leq 0.05 \quad \text{HS} \]

### Conclusion

More than third of participant has a Suggestion depression

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.
References

MicroRNA196a2 rs11614913 Genotypic in Iraqi Newborn Babies with Neural Tube Defects

Alaa Hadi Skakir¹, Rabab Omran¹

¹Department of Biology, College of Science, University of Babylon, Al-Hillah City, Babel, Iraq.

Abstract

Objective: Neural tube defects (NTDs) are complicated human structural deformities occur in newborn babies. The etiology of NTDs is multifactorial contributed both genetic and environmental influences to appear the abnormal phenotype. The analysis of Single Nucleotide Polymorphisms of major contributed genes is still unknown. This paper aimed to investigate miR-196a2 polymorphisms in NTDs newborn patients. The blood samples were collected from newborn babies with NTDs (40 samples) and 40 samples of healthy newborn babies as a control group from August of 2016 to October of 2017. The genotyping of miR-196a2 were performed using Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP) method. Results: There were vital variations within the genotype frequencies of miR-196a2 between patients with NTD and control groups using the \( P=0.02 \), \( OR =0.50 \) (0.26-0.95). There were significant variations of the genotype TC of patients (27.5%) and healthier (10%) groups and TT genotype. Whereas CC genotype had not any variation between the studied groups. Conclusion: Our study suggests that miR-196a2 rs11614913 T > C may contribute to NTD susceptibility but this data required further studies with larger sample size to comprehensive data for confirming our findings and providing a profound conclusion.

Keywords: Tube neural defect, miRNA, rs11614913 SNP, PCR-RFLP.

Introduction

Neural tube defects (NTDs) are categorized as the second common of birth defects, including an opening in the spinal cord or brain remains from early in human development. On the gastrulation stage of the third week of pregnancy, the neural tube formed by the changing shape of specialized cells on the dorsal side of the embryo. NTDs developed if the neural tube does not close completely. There are specific types of NTDs including anencephaly (results in little to no brain), spina bifida (affects the spine), anencephaly (results in severe neck problems) and encephalocele which affects the skull [¹]. Structural deformities in mice were studied by deletion of single miRNAs gene or entire gene clusters which resulted incompletely penetrant embryonic phenotypes or defects postnatally. In spite of, there are no evidences that confirmed an absolute requirement for a specific miRNA locus in embryonic development. These findings also showed in other animals like nematodes and zebrafish, which concluded that the miRNAs play a role in fine-tune gene expression rather than had central roles in the embryonic development [²]. There are two clusters of genes encoding multiple microRNAs (miRNAs) by alternative processing such as miR-302c and thus together form a miRNA family [³]. The preliminary role of this family was identified in the regulation of the unique cell-cycle structure of embryonic stem cells (ESCs), and named as ESC cell cycle regulating miRNAs. Since then, multiple functions have been investigated for these miRNAs, including inhibition of ESC differentiation, cell-cycle regulation, promotion of somatic cell reprogramming and inhibition of apoptosis [⁴]. MicroRNAs are small RNA molecules had 21–22 nucleotides in typical length. They are commonly transcribed by the sequential action of two endonucleases (Drosha and Dicer) on primary transcripts.

Corresponding author:
Rabab Omran,
Professor of Biotechnology- Genetic Engineering in Department of Biology, College of Science, University of Babylon, Al-Hillah City, Babel, Iraq. Email: omranaljelawi@gmail.com.
of miRNA, although Drosha-independent processing can occur in certain instances. Mature miRNAs bind to target mRNAs and simplify RNA assembly which induced silencing complex, enhancing mRNA turnover and suppressing translation. Some miRNAs have other functions include up-regulation of translation in some context, influence both positively and negatively of a range of signalling pathways and are implicated in various disease states, particularly cardiovascular, cancer and immune disorders. Also, a specific miRNAs are present in the central nervous system where they influence cell cycling, cell differentiation, and apoptosis during development. It has been reported that folate deficiency and DNA hypomethylation can lead to misexpression of miRNAs which in turn may substantially affect neural development. Owing to the role of folate in the methylation pathway, it is accepted that disturbed methylation may significantly account for the relation between NTDs and folate, reinforcing the epigenetic hypothesis. The aim of this paper was to investigate a single nucleotide polymorphism (SNPs) as a risk factor in a microRNA gene (miR-196a2-rs11614913) and associated with tube neural defect.

Materials and Method

Study subjects

Forty newborn babies with neural tube defects how visited the hospitals in the middle and south of Iraq. In addition to forty of healthy newborn babies as a control group were included in this study.

DNA Extraction

Venous blood was collected from patient and healthy control groups during medical visits, stored at -20 °C until DNA extraction processed.

Genomic DNA from whole blood cells was extracted and purified using Gene aid Extraction and Purification Kit (Germany).

MicroRNA196a2 Genotypic by PCR- RFLP method

The DNA targeted site for identifying pre-microRNA196a2 (rs s11614913) was amplified using specific primer pair (Forward: 5'-CCCCTTCCCCCTCTCCA-3' and the Reverse: 5'- CGAAACCGACTGATGTAAC-3') which were obtained from Bioneer, IDTDNA (USA).

PCR was performed using a TRIO Thermal Cycler (Biometra, Germany) programmed for 2 min pre-denaturation at 94°C; for 35cycles 5 min each at 94°C, 1 min at 57.8°C and 1 minute at 72°C; and a last expansion of 5 min. The reaction volume was 20μl containing 1 μl from each reverse and forward primers, 12.5 μl of Green Master Mix, 3 μl of Genomic DNA and 2.5 μl of the Nuclease free water. PCR products were electrophoresed using 1% agarose at 75 V for 1 h in horizontal electrophoresis (Cleaver Scientific – UK) and visualized by ethidium bromide. Photographs were taken by gel documentation system (Cleaver Scientific –UK). The PCR products were cut by MSPI restriction endonuclease, the PCR-RFLP method was achieved steady with the Promega Company Protocol. After digestion with MSPI reaction were electrophoresed using 2% agarose gel electrophoresis at 75 V for 1 h. After that gels visualized by ethidium bromide. Photographs were taken using gel documentation system.

Statistical analysis

All the practical math analysis was achieved using the SPSS applied mathematics software system (17; SPSS Inc., Chicago, IL) at P-values <0.05.

Results and Discussion

This a study case was conducted on Iraqi newborn patients with neural tube defects (NTDs) who admitted to the Neuro-surgical Department at hospitals and under went to a surgery for repair of NTDs. The table (1) showed gender of patients and control groups. The results showed that the percentage of females to males in patients is more than two folds as in controls. Genomic DNA was extracted from the blood samples of patient and control groups, then targeted region of pre-c was amplified. The amplified product had up to 149bp which appeared in the agarose gel electrophoresis (Fig. 1). After that the PCR products were digested by MSPI enzyme and the polymorphisms of miR-196a2 rs11614913 quality were revealed by PCR-RFLP technique; the existences three genotype polymorphisms, including homozygous genotype (CC) had two bands (125bp and 24bp), homozygous genotype (TT) had one DNA band (149bp) and heterozygous genotype (TC) had three DNA bands (149bp, 125bp and 24bp) as shown in figure (2). The percentage of females to males in patients is more than two folds as in controls, as in table (1) may refer the nature of society that prefers male to female, so the
planned pregnancy mostly for males and unplanned for females. This results agreements with historical study [9] which found that the ratio is 67% (female: male). While the new studies showed that the ratio change after fortification with folic acid [10]. The miR196a2-rs11614913 T>C polymorphism was studied in NTDs cases and controls as shown in table (2), which revealed the highest genotype in the control group was CC homozygous genotype (47.5%) followed by the mutant homozygous genotype TT (42.5%) and heterozygous genotype TC (10%). In neural tube defects, the highest genotype was CC homozygous (55%); the genotyping distribution pointed out that normal homozygous TT was 17.5% and mutant heterozygous TC, which reached to 27.5%. MicroRNAs (miRNAs) are small noncoding RNAs that regulate posttranscriptional gene expression. The presence of specific miRNAs is enriched in the central nervous system where they influence cell cycling, cell differentiation, and apoptosis during development [11]. It has been reported that folate deficiency and DNA hypomethylation can lead to mis-expression of miRNAs which in turn may substantially affect neural development, among the subset of miRNAs known to be regulated by methylation [12]. Recent evidence supports this line of reasoning. It is interesting to note that at least half of the promoter regions for miRNAs are predicted to be in close proximity to CpG islands and their methylation frequency is predicted to be at least an order of magnitude higher than that of protein-coding genes. Removal of individual miR-196 paralogs alone revealed partially penetrate homeotic patterning defects. In 196a2 or 196b single-mutant embryos, the presence of an ectopic rudimentary rib nubbin on the first lumbar vertebra indicated an anterior homeotic transformation of this element. Additionally, miR-196a have been shown to target multiple Hox genes, some of which are implicated in NC development HDAC4 is required for the generation of anterior facial structures in zebrafish by modulating the migration of cranial NC cells [13]. The causes of NTDs appear to be complex and multifactorial, involving both genetic and environmental factors. Few single genes have yet been found to be major contributors to NTD susceptibility and, whereas several environmental risk factors are known (e.g. Maternal diabetes, valproic acid), the causes of NTDs is not known or predictable in the majority of cases. Prenatal diagnosis of NTDs provides options for management of affected pregnancies, including elective termination, preparation for postnatal care or, in a few centers, in utero surgery. Finally miRNA biology must be viewed as a crucial facet of neuronal function, particularly with regard to development and plasticity. The rapid pace and excitement of miRNA research derives from the high expectations 3 that much more profound insights will emerge in the near future as the rich vein of miRNA data is further mined and new experiments peel away the details of their functions.

Table (1) Population gender of the study

<table>
<thead>
<tr>
<th>Gender of patients NO. (%)</th>
<th>Gender of controls NO. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td>12 (30)</td>
<td>18 (45)</td>
</tr>
<tr>
<td>Female</td>
<td>Female</td>
</tr>
<tr>
<td>28 (70)</td>
<td>22 (55)</td>
</tr>
</tbody>
</table>

Table (2): Genotyping distribution of pre-miR196a2-rs 11614913 polymorphisms and their association in control and patient groups

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Patients No. (%)</th>
<th>Control No. (%)</th>
<th>P-value</th>
<th>OR (95%) of NTDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT</td>
<td>7 (17.5%)</td>
<td>17 (42.5%)</td>
<td>0.01</td>
<td>6.67 (1.53-28.29)</td>
</tr>
<tr>
<td>TC</td>
<td>11 (27.5%)</td>
<td>4 (10%)</td>
<td>0.04</td>
<td>2.81 (0.96-8.22)</td>
</tr>
<tr>
<td>CC</td>
<td>22 (55%)</td>
<td>19 (47.5%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T allele</td>
<td>25</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C allele</td>
<td>55</td>
<td>42</td>
<td>0.02</td>
<td>0.50 (0.26-0.95)</td>
</tr>
</tbody>
</table>

Fig. 1: Agarose gel electrophoresis of pre-miR-196a2 rs 11614913 amplification products of patients and control groups.
**Fig. 2**: Agarose gel electrophoresis of PCR-RFLP patterns of NTDs and healthy subjects allelotyping (rs11614913 SNP) using MspI enzyme.

**Conclusion**

Our study suggests that miR-196a2 rs11614913 T > C may contribute to NTD susceptibility but this data required further studies with larger sample size to comprehensive data for confirming our findings and providing a profound conclusion.

**Financial Disclosure**: There is no financial disclosure.

**Conflict of Interest**: None to declare.

**Ethical Clearance**: All experimental protocols were approved under the Department of Biology, College of Science, University of Babylon, Al-Hillah City, Babel, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

Nutritional Status of Older Adults in Al-Nasiriyah City

Hussein Jassim¹, Alaa M Tuama¹, Hassan Alwan¹

¹ College Nursing, University of Babylon, Iraq

Abstract

A good nutrition for a person is essential to the good healthy body and prevents diseases and other health problems, the individual should be provided with knowledge about nutrition and the body nutritional requirement through the lifespan. Objective: To Assessing Nutritional status of Older Adults in Al-Nasiriyah City. A descriptive cross-sectional study was conducted at the community based population, A purposive “non-probability” sample of (300) participants who were selected from the community based population, health care center, key card offices and Geriatric Homes in Thi-Qar for the period from February 15th 2018 to April 26th of 2018. The study results have indicated that more than half of participants are within 65-74 years-old (n=209; 69.7%), their gender is approximate; (n=155; 51.7%) for male; more than half of them are Illiterate (n=165; 55.0%); more than a third of the elderly are occupying Housewife and Retired equally (n=118; 39.3%), the majority of them live in urban areas (n= 219; 73.0%); less than half of them report that their monthly income is Enough (n=131; 43.7%) , The result reveals that This table reveals that less than half of participant has a Risk of malnutrition (n=148; 49.3%).

Keywords: Nutritional status; Older Adults.

Introduction

Nutrition is a group of activities through which vital organs absorb and metabolize nutrients entering the body. The main nutritional characteristics of the body are to nourish the body with basic materials to build healthy body, promote health, prevent disease and keep the body healthy from health problems. Therefore, society must be healthy about the nutrition and nutritional needs of the body during the life span and the person should feed the food containing proteins, carbohydrates and vitamins Suitable for the body to get the perfect nourishment for a perfect hyacinth body. Eating is very important and essential to the human body for the purpose of feeding the body with the basic nutrients and provide him with healthy food to carry out the basic processes of the functions of the body organs regularly. Taking food is considered the best way to measure healthy nutrition and its ease of monitoring and measuring its suitability to the body and also to know its consistency and usefulness, through which we can determine the appropriate nutrition for each person.

Malnutrition is one of the problems that cause the health diseases resulting from lack of the main nutrition needed by the body tissues to maintain the sustainability of the vital activities of the body and that this problem is one of the factors contributing to complications of diseases and therefore malnutrition is divided into two parts either lack of nutrition or increased nutrition is undernourishment Protein is a form of malnutrition, one of the health problems that accompany the elderly in the homes of the elderly and those in the community and the rate of consultation between them estimated about 30-60% over nourishment is a type of malnutrition in people who are obese and it is the cause of this type of malnutrition. Weight gain and obesity are considered to be one of the main problems or the most important issues facing the society in Malta. The BMI rate is more than (25 kg) for women and men over the age of 65 and above in society (72.7%) and (62.5%) respectively.

Malnutrition in the elderly is always accompanied by a lack of daily physical activities and this causes them to many health problems, ranging from malnutrition to the lack of anthropometric measurement when measured for the elderly according to the standards used and that are
accredited to assess the nutritional status of the elderly, an important indicator of the nutritional status. For the elderly, and also through the treatment and improvement of the problem as soon as detected early for the purpose of intervention to take measures and procedures through which the case.

Methodology

A descriptive cross-sectional descriptive sample of 300 elderly people in the community, health care center, cardiology offices and geriatrics was conducted in Thi-Qar from November 11, 2017 to June 2018. The inclusion criteria are met.

Administrative arrangements

Another approval was obtained from the Ministry of Health under a contract between the College of Nursing. The approval of the Ministry of Health / Health Directorate of Dhi Qar Governorate and health care centers was obtained, in addition to an official authorization from the Ministry of Health. Work and social affairs to collect the required data and interview all older subjects.

Data collection and tools:

The data were collected using a questionnaire designed and developed for study purposes. The questionnaire was created after a comprehensive review of available literature and related studies. The study instrument consists of two parts. The first part covers the demographic characteristics of age, sex and education participants, ... etc. Part II on nutrition assessment for older persons is an assessment tool that can be used to identify older persons (65 years) at risk of malnutrition. Used to identify possible elements for instrument study. Adapted from the Hartford Institute of Nursing Elderly, New York University, Faculty of Nursing. The data were collected by elderly researchers, those visiting card offices, the health care center, the aging home in Dhi Qar and the community population in Dhi Qar Governorate through the interview and by completing the questionnaire form. A statistical analysis was performed using the Microsoft office excel 2007 and SPSS package (version 19).

Results and Discussion

Results of the study are the current show in Table (1) was the highest percentage in the reconstruction study participants between the (65-74) age where up frequency 209 and percentage of 69.7, A study conducted in Angelique Chan et al showed that 64.8% women were less than 30 years with age group (60-70). Because this age group is the most active and vital of the other categories so it is easy to get them sample for research. The study percentage of males in equal with females because researchers have relied upon to be ratio close and gender we find that. The results referred to study sample to that 55.0 % of illiterate and the percentage of recurrence was 165, this agree with the study in Boulos Christa1 et al showed that frequency 350 were illiterate. Because the country was lacking in education and the lack of educational institutions and the community was the cause of ignorance and scientific backwardness. With regard to the profession was more than half Posts participate are housewives where she was replicated 118 and increase of 39.0, A study conducted in Kalyobia showed that 58% were housewife. And because it most of the samples participate are illiterate -with regard to logic housing in the study are from the city so that the Thus reducing the chance of getting a job. The results referred to study sample to that 73.0 % in urban and the percentage of recurrence was 219 this agree with the study in Marianne Baernholdt et al showed that 73.83 %. Due to migration from rural to urban and industrial revolution and also places of study are located in city centers, were the results of overall Participants’ Assessing Nutrition in Older Adults there are less than half at risk of malnutrition, This agree with the study of Khin Thandar Aung showed that the elderly have risk of malnutrition because the elderly are in the stage of demolition as well as because of some chronic diseases that limit access to healthy food beneficial to the body and also poor dental health. With respect to high significant association between Assessing Nutrition and their Age, there are between the(65-74) age risk of malnutrition, This agree with the study of Boulos Christa1 et al, showed that age between (65-75) risk of malnutrition frequency 110 and percentage (32.3 %)Due to a change in the quality of life in the elderly were the results to find the relationship between Assessing Nutrition and Level of education, illiterate risk of malnutrition (43.0 %) and frequency 71, a study Boulos Christa1 et al, showed that illiterate risk of malnutrition (38.6 %) and frequency 135, Because of the lack of knowledge about healthy foods, which is why the elderly are more vulnerable to malnutrition. With regard to the association between Assessing
Nutrition and Occupation was more than half Posts participate are housewives where she was replicated 55 and increase of 46.6, A study conducted in Kalyobia showed that 58% were housewife. And because it most of the samples participate are illiterate -with regard to logic housing in the study are from the city so that the percentage of recurrence 117 and percentage 78.0 and because it quality of life take on the nature of the samples participate society are from city in additional to widespread emigration from the countryside to the urban has changed the pattern of city life community.

**Table (1): Distribution of the participants Socio-Demographic Characteristics**

<table>
<thead>
<tr>
<th>Age</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-74</td>
<td>209</td>
<td>69.7</td>
</tr>
<tr>
<td>75-84</td>
<td>66</td>
<td>22.0</td>
</tr>
<tr>
<td>85 and above</td>
<td>25</td>
<td>8.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>155</td>
<td>51.7</td>
</tr>
<tr>
<td>Female</td>
<td>145</td>
<td>48.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of education.</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>165</td>
<td>55.0</td>
</tr>
<tr>
<td>Reading</td>
<td>61</td>
<td>20.3</td>
</tr>
<tr>
<td>Primary</td>
<td>30</td>
<td>10.0</td>
</tr>
<tr>
<td>Intermediate</td>
<td>14</td>
<td>4.7</td>
</tr>
<tr>
<td>Preparatory</td>
<td>17</td>
<td>5.7</td>
</tr>
<tr>
<td>University</td>
<td>13</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Occupation</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewife</td>
<td>118</td>
<td>39.3</td>
</tr>
<tr>
<td>Wage earner</td>
<td>23</td>
<td>7.7</td>
</tr>
<tr>
<td>Retired</td>
<td>118</td>
<td>39.3</td>
</tr>
<tr>
<td>Does not work</td>
<td>41</td>
<td>13.7</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resident</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>219</td>
<td>73.0</td>
</tr>
<tr>
<td>Rural</td>
<td>81</td>
<td>27.0</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Monthly income</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enough</td>
<td>131</td>
<td>43.7</td>
</tr>
<tr>
<td>Enough to some extent</td>
<td>123</td>
<td>41.0</td>
</tr>
<tr>
<td>Not enough</td>
<td>46</td>
<td>15.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table (2): Overall participants’ assessing nutrition in older adults**

<table>
<thead>
<tr>
<th>Assessing Nutrition</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnourished</td>
<td>50</td>
<td>16.7</td>
</tr>
<tr>
<td>Risk of malnutrition</td>
<td>148</td>
<td>49.3</td>
</tr>
<tr>
<td>Normal</td>
<td>102</td>
<td>34.0</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table (3): Association between the elderly assessing nutrition and their ages

<table>
<thead>
<tr>
<th>Age</th>
<th>Assessing Nutrition</th>
<th>Assessing Nutrition</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malnourished</td>
<td>Risk of malnutrition</td>
<td></td>
</tr>
<tr>
<td>Young old (65-74)</td>
<td>50 (23.9%)</td>
<td>148 (70.8%)</td>
<td>209 (100%)</td>
</tr>
<tr>
<td>Middle old (75-84)</td>
<td>0 (.0%)</td>
<td>0 (.0%)</td>
<td>66 (100%)</td>
</tr>
<tr>
<td>Old old (85 and above)</td>
<td>0 (.0%)</td>
<td>0 (.0%)</td>
<td>25 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>50 (16.7%)</td>
<td>148 (49.3%)</td>
<td>300 (100%)</td>
</tr>
</tbody>
</table>

χ²obs. = 253.560; χ²crit. = 9.488; df= 4; P<0.05 HS

### Table (4): Association between the elderly assessing nutrition and their gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Assessing Nutrition</th>
<th>Assessing Nutrition</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malnourished</td>
<td>Risk of malnutrition</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>30 (19.4%)</td>
<td>75 (48.4%)</td>
<td>155 (100%)</td>
</tr>
<tr>
<td>Female</td>
<td>20 (13.8%)</td>
<td>73 (50.3%)</td>
<td>145 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>50 (16.7%)</td>
<td>148 (49.3%)</td>
<td>300 (100%)</td>
</tr>
</tbody>
</table>

χ²obs. = 1.735; χ²crit. = 5.9915; df= 2; P<0.05 NS

### Table (5): Association between the elderly assessing nutrition and level of education

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Assessing Nutrition</th>
<th>Assessing Nutrition</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Malnourished</td>
<td>Risk of malnutrition</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>17 (10.3%)</td>
<td>71 (43.0%)</td>
<td>165 (100.0%)</td>
</tr>
<tr>
<td>Reading</td>
<td>12 (19.7%)</td>
<td>29 (47.5%)</td>
<td>61 (100.0%)</td>
</tr>
<tr>
<td>Primary</td>
<td>7 (23.3%)</td>
<td>20 (66.7%)</td>
<td>30 (100.0%)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>6 (42.9%)</td>
<td>8 (57.1%)</td>
<td>14 (100.0%)</td>
</tr>
<tr>
<td>Preparatory</td>
<td>4 (23.5%)</td>
<td>11 (64.7%)</td>
<td>17 (100.0%)</td>
</tr>
<tr>
<td>University</td>
<td>4 (30.8%)</td>
<td>9 (69.2%)</td>
<td>13 (100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>50 (16.7%)</td>
<td>148 (49.3%)</td>
<td>300 (100.0%)</td>
</tr>
</tbody>
</table>

χ²obs. = 42.707; χ²crit. = 18.307; df= 10; P<0.05 HS
Conclusion

The results to find the relationship between Assessing Nutrition and Monthly income, enough to risk for malnutrition. Because limited monthly income reduces the opportunity to buy healthy foods.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

References

5. Khin TA. Nutritional Status of Institutionalized Elderly Critical Care Nursing Department, Kulliyyah of Nursing, International Islamic University Malaysia, Kulliyyah of Nursing, International Islamic University Malaysia. 2016.
Pregnant Women’s Knowledge Concerning Tetanus Vaccination in Al-Rusafa Health Sector

Rusul S. Ghazal¹, Eman A. Jaber²

¹Nursing Technology Department, Medical Technical Institute / Baghdad, Middle Technical University, Baghdad, Iraq, ²College of Nursing ALbayan University, Baghdad, Iraq

Abstract

Tetanus Toxoid (T.T) is an inactivated vaccine (antigen) that is given to women of childbearing age (15 years to 49 years) to protect the unborn child from neonatal tetanus. Objectives: To assess pregnant women’s knowledge concerning important of tetanus vaccination. A descriptive analytic study on non-probability sample (purposive sample) of (100) Pregnant women who attend primary health center in Baghdad city during the period from 3-2-2016 to 15-3-2016. The questionnaire form was consisted of 3 parts: Demographic characteristics, pregnant women’s knowledge concerning tetanus vaccination and its importance. The data were collected by using interview method and self-report techniques with study participant. The study showed that the highest percentage (32 %) of study sample at age group (15-20 years), (94%) of study sample they are attending primary health care clinic regularly , The highest percentage (33%) of study was taking the first dose during reproductive age, the highest mean score and relative sufficient according to pregnant women’s knowledge concerning tetanus vaccination (there is disease called tetanus), while the highest percentage related to (Causes of tetanus organism). Concerning reasons for not taking the Routine Booster of the vaccine the highest percentage (52%) was (Crowding the health center).

Keywords: Tetanus Vaccination, Pregnant women, primary health care.

Introduction

Tetanus is a vaccine-preventable disease that causes an annual total of 309 000 deaths¹. Globally every year 309,000 deaths occur due to tetanus. It is estimated that every year worldwide 5% of maternal deaths occur due to tetanus and 14% of all neonates die due to maternal neonatal tetanus, even the end November 2012 maternal neonatal tetanus still remains a public health problem in 31 countries, predominantly in the African and Asian regions, Iraq is still pre validated for maternal neonatal tetanus elimination ². Of particular concern is maternal and neonatal tetanus which represents triple failure of public health in terms of routine vaccinations, antenatal care and clean delivery/umbilical cord care services. Is a swift and painful killer that killed about 200 000 newborns in year 2000³. Tetanus it is caused by the Clostridium tetanus bacteria spores which are ubiquitous in the environment and can be introduced into the body through no intact skin and open wound, usually via injuries from contaminated objects ⁴. Even the end November 2012 maternal neonatal tetanus remains a public health problem in 31 countries, predominantly in the African and Asian regions, Iraq is still pre validated for maternal neonatal tetanus elimination ⁴. The Tetanus Toxoid (TT) vaccine is given during pregnancy to prevent the risk of tetanus as well as unborn baby. Although the tetanus infection is more common when there is a deep puncture wound such as a bite, cut, burn or an ulcer, it may well be caused by a tiny prick or scratch on the skin⁵.

Objectives of this study

The objectives of this study Assess pregnant women’s knowledge concerning important of tetanus vaccination and find out the relationship between...
pregnant women’s knowledge and studied variables.

Methodology

A descriptive analytic study was conducted to assess the Pregnant women’s knowledge concerning Tetanus Vaccination. Non-probability sample (purposive sample) consisted of (100) Pregnant women who attend primary health center. Through using the assessment approach for the period from November 2015to May 2016. The study was conducted at two setting in Al-Russifa health directorate / Al sadder sector and Albaleduat sector in Baghdad city.

The instrument was designed and constructed by the investigator after reviewing related literatures, clinical background and previous studies. The questionnaire form was consisted of (3) main parts: Demographic characteristics, pregnant women’s knowledge concerning tetanus vaccination and its importance .The data were collected by using interview method and self-report techniques Statistical procedures include descriptive statistic (frequency, mean, percentage).

Results and Discussion

Table (1) shows that the highest percentage (32 %) of study sample at age group (15-20 years) while the lowest percentage (8%) of them their age (36 years and more). The highest percentage (41%) of study sample was Secondary school graduated, while the lowest percentage (3%) of them Illiterate. The highest percentage (75%) of study sample were in 16-24wk, while lowest percentage (4 %) in 3> wk. The highest percentage (76%) of study sample they do not work. The highest percentage (94%) of study sample they are attending primary health care clinic regularly. The highest percentage of the study sample (38%) taking the vaccine during previous pregnancy. The highest percentage (33%) of study was taking the first dose during reproductive age. Table (2) shows that the highest percentage according to Pregnant women’s knowledge concerning Tetanus Vaccination (76%) refers to (there is disease called tetanus), while the highest percentage (62%) related to (Causes of tetanus organism) and the highest percentage related to Method of infected (66%) (Use of non-sterile instruments during childbirth). The highest percentage of study sample (66 %) didn’t know (Pain and stiffness in the face and abdomen and arm muscles). The highest percentage (84%) related to (The vaccine is given in the form of injection) and (88%) (The vaccine protects the mother and child and prevent the disease). The highest percentage for not taking the Routine Booster of the vaccine (52%) related to (Crowding the health center).

Table (4) shows that there was statistical significant relationship between level of knowledge and (level of education and occupational status), while there were no statistical significant relationship between level of knowledge and (age, gestational age). The present study revealed that the highest percentage (32%) of study sample at age group (15-20 years).

This data is in line with study of Masuno et al. (2009) that reported the highest percentage (47.2%) for women of reproductive age (15-45) years out of (212) were at age group between (20-29) years with mean. Regarding Level of education the highest percentage (41%) of study sample at secondary school graduated. Hashmi et al.(2011) who reported that education level plays a significant role in the vaccination coverage of mothers during pregnancy and their children. Regarding Gestational age the highest percentage (75%) of study sample were in 16-24wk. Maral et al. (2001) stated that the vaccination women with at least one dose attended more prenatal care visit than the unvaccinated women of the women who attended at least one prenatal care check-up, only about half were vaccinated. Regarding Occupational status, the highest percentage (76%) of study sample not work. The findings of present study were consistent with Naeem et al. (2010) who reported that the most of study sample were housewives (89.8%), while (4.6%) of them were governmental occupation. Regarding attending primary health care clinic, the highest percentage (94%) of study sample they are attending primary health care clinic regularly for receiving the vaccine. The finding of present study were inconsistent with Adugna (2011) reported that the highest percentage of women was unrestricted to go out without the permission of their husband while the lowest percentage (16.8%) of them was restricted. Regarding Take the first dose of vaccine: the study sample (38%) they taking the vaccine during previous pregnancy. Adugna (2011) reported that the (48.3%) of women were immunized in the first trimester and (43%) were immunized during 5-7 months of their pregnancy. The highest percentage (33%) of study was taking the first dose during reproductive age. Roosiermatie et al. (2000) stated that the mothers who performed antenatal care tended to be highest for T.T immunization practice where the mothers who performed antenatal care were 30 times more likely to get TT immunization.
compared with those who never got any antenatal care. Regarding Pregnant women’s knowledge concerning Tetanus Vaccination, the highest mean score and relative sufficient (1.76) refers to (there is disease called tetanus). The finding of present study were consistent with Naeem et al. (2010) which reported that the most of study sample had a knowledge on tetanus toxoid vaccination (31.8%), while a significant number had little knowledge (13.8%) while the highest mean score and relative sufficient related to (Causes of tetanus its organism) (1.62). The finding of present study was consistent with those of Dallak and Al-Rabeei (2012) which reported that the majority of the participants 72.4% heard about tetanus toxoid (TT) vaccine. A majority 62.6% did not believe that vaccination is harmful, only 24.9% believe that the unclean umbilical cord stamp and unclean delivery practice play a role in etiology of tetanus. Demicheli et al. (2015) reported the pregnant women know that the tetanus vaccine has shown to be successful in preventing babies from developing tetanus and deaths from tetanus. Concerning Signs and symptoms of tetanus the low mean score and relative sufficient (1.34) for (Pain and stiffness in the face and abdomen and arm muscles) and Pregnant women’s knowledge concerning vaccination the highest mean score and relative sufficient (1.84) related to (The vaccine is given in the form of injection) and (1.88%) related to (The vaccine protects the mother and child and prevent the disease). Maral et al. (2001) reported about half of pregnant women knew about use of tetanus toxoid for preventing tetanus, among those samples knew some tetanus symptoms, most mentioned one symptom only, was a seizure. Concerning reasons for not taking the Routine Booster of the vaccine the highest mean score and relative sufficient (1.53) related to (Crowding the health center). Hammer et al. (2001) reported that crowding at primary health care clinics on developing countries have effects on type of health care, services and facilities, which is typically provided. The present study revealed that there was statistical significant relationship between level of knowledge and (level of education and occupational status). Duper (2008) who stated that the well-educated reported a greater control over our lives and health.

### Table (1): Distribution of the study sample according to demographic characteristics n=100

<table>
<thead>
<tr>
<th>Groups</th>
<th>Freq.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Groups</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>21-25</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>26-30</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>31-35</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>36 and more</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Education Levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Primary</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Secondary</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>College</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td><strong>Gestational age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-24wk</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>25-33wk</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>33&gt;wk</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Occupational status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Not work</td>
<td>76</td>
<td>67</td>
</tr>
<tr>
<td><strong>Attending of the primary health centers regularly</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>94</td>
<td>94</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><strong>Take the first dose of vaccine before married</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td><strong>Dose taking during reproductive age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>during previous pregnancy</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>during current pregnancy</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>after delivery</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>didn’t take any dose</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>didn’t take any dose</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>First dose</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Second dose</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>Third dose</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Fourth dose</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>
Table (2): Distribution of the study sample according to Pregnant women’s knowledge concerning Tetanus Vaccination and its importance (n = 100)

<table>
<thead>
<tr>
<th>2-Items related to knowledge</th>
<th>I know</th>
<th>I don’t know</th>
<th>Ms</th>
<th>Asses.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>1. disease called tetanus</td>
<td>76</td>
<td>76</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>2. Causes of tetanus organism</td>
<td>62</td>
<td>62</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>3. Tetanus not infected disease</td>
<td>46</td>
<td>46</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>4. There tetanus spores in the soil and animal waste and dust</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>5. Method of infected</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.1. Use of non-sterile instruments during childbirth</td>
<td>66</td>
<td>66</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>5.2. Cut the umbilical cord with contaminated instrument</td>
<td>61</td>
<td>61</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>6. Signs and symptoms of tetanus</td>
<td>42</td>
<td>42</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>6.2. Pain and stiffness in the face and abdomen</td>
<td>34</td>
<td>34</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>7. Vaccination against tetanus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.1. There is tetanus vaccine</td>
<td>75</td>
<td>75</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>7.2. Vaccination against tetanus is important</td>
<td>78</td>
<td>78</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>7.3. The vaccine is given in two doses during pregnancy</td>
<td>62</td>
<td>62</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>7.4. Pregnent not take vaccine considered at risk</td>
<td>74</td>
<td>74</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>7.5. The vaccine is given in the form of injection</td>
<td>84</td>
<td>84</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>7.6. The vaccine protects only the mother</td>
<td>46</td>
<td>46</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>7.7. The vaccine protects a child</td>
<td>56</td>
<td>56</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>8. The vaccine protects the mother and child</td>
<td>88</td>
<td>88</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>8.1. Causes abortion</td>
<td>20</td>
<td>20</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>8.2. Affect the fetus</td>
<td>37</td>
<td>37</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>8.3. Fear from pain of injection</td>
<td>44</td>
<td>44</td>
<td>56</td>
<td>56</td>
</tr>
<tr>
<td>8.4. The vaccine is not important</td>
<td>17</td>
<td>17</td>
<td>83</td>
<td>83</td>
</tr>
<tr>
<td>8.5. Faraway the health center</td>
<td>23</td>
<td>23</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>8.6. The vaccine is not available</td>
<td>36</td>
<td>36</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>8.7. Crowding the health center</td>
<td>53</td>
<td>53</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>8.8. The Family does not allow</td>
<td>19</td>
<td>19</td>
<td>81</td>
<td>81</td>
</tr>
</tbody>
</table>
Table (3) Shows the association between Level of Knowledge of Study Sample and Studied Variables

<table>
<thead>
<tr>
<th>Studied variables</th>
<th>Knowledge level</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37 and less</td>
<td>38 and more</td>
<td>( \chi^2 )</td>
<td>d.f</td>
<td>P-value</td>
</tr>
<tr>
<td>Age</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>25</td>
<td>25</td>
<td>34</td>
<td>34</td>
<td>6.491</td>
</tr>
<tr>
<td>25-34</td>
<td>7</td>
<td>7</td>
<td>26</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>35 and more</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td>Primary &amp; institute</td>
<td>14</td>
<td>14</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Intermediate &amp; secondary</td>
<td>17</td>
<td>17</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Institute &amp; college</td>
<td>6</td>
<td>6</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Occupational status</td>
<td>Work</td>
<td>2</td>
<td>2</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Not work</td>
<td>36</td>
<td>36</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Gestational age</td>
<td>16-24wk</td>
<td>31</td>
<td>31</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>25-33</td>
<td>4</td>
<td>4</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>33 and more</td>
<td>2</td>
<td>22</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

**Conclusion**

There were high mean of score in most items related to the knowledge women’s concerning Tetanus Vaccination. There was statistical significant relationship between level of knowledge and (level of education and occupational status).

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**


Prevalence of Septicemia among Under Five Years Children during the Last 5 Years Ago in Hilla City


Community Health Nursing/ Babylon Health Directorate- Iraq, Department of Basic and Medical Science, College of Nursing, Babylon University, Babylon Province, Iraq, College of Nursing/ Babylon University- Iraq, Community Health Nursing, Kut Technical Institute/ Middle Technical University- Iraq

Abstract

The body invades and proliferates living organisms and causes them to have their own symptoms. Infection may include several organisms at the same time and are called co-infection.

Methodology: A descriptive analytic study design was conducted for the period of October 1st to January 2nd 2018. In order to identify prevalence of septicemia in children under than five years. Data collected retrospectively by the used medical records as a statistic for each year of the (2014 to 2018), and analyzed through the descriptive statistic approach.

Results: the study results reveals that (30.9%) a majority of septicemic children prevalence in the 2014 and the low proportion at the year of 2015.

Conclusions: A very large disparity between the years of prevalence that the more time progresses the less prevalence depending on health services. It is need to be conducted to involve a national level and assessed the associated factors with septicemic children.

Keywords: Prevalence, Septicemia, Children

Introduction

Sepsis may be a physiological state caused by the unfold of invasive organisms, or their by-products, through the blood or in different tissue within the body. It’s conjointly referred to as blood disorder 1. Sepsis remains the initial cause of death from infection in spite of improvement in modern medicine included vaccines, antibiotics and intensive care. Is a dangerous and complex hostess response to the infection that affects millions of people around the world every years (2). It Sepsis considered a one reasons ofmortality and morbidity, particularly throughout the primary 5 days of life and in low and middle-income countries 3. Mostly the theater of life condition faced by the in pediatric intensive care units (PICUs) worldwide 4,5. According to the world health organization (WHO), every year 4 million newborns die throughout the 1st month of life, newborn infections are currently the rationale for 1.6 million deaths every year within the developing world, and the 1st cause of newborn mortality is infection 6. More than 40% of beneath-five deaths globally happen within the time of life leading to 3.1 million of newborn deaths each year 7. Sepsis account for about 2% of hospitalizations; it created up 17 % of hospital deaths. If left untreated, infection will lead for a large number of complications including multiple organ dysfunction and even death 8. Critical care nurses should have sound knowledge and strict adherence to sepsis bundle 9. Too, they stay in bestsituation for make sure patientstudied, Viarising their privateawarenessthen consciousness tosepticemia, thereby prevention impairment into starkersepticemia . in place of eachperiod’sinterval in starting management, a patient’s danger of died will increase through seventy six percent 10.

Metodology

The study aims

To identify prevalence of septicemia in children under five years.
Study Design: A descriptive analytic study design was used for the purpose is conducted at Babylon Teaching Hospital for Maternity and Pediatric.

Study Sample: Non probability a convenience sample was were collected retrospectively from medical records as a statistic for each year of the (2014 to 2018).

Data Analysis: In order to determine whether the objectives of the study have met or not, that data of the present study has been analyzed through application of the descriptive statistical (SPSS) version XX analysis approach.

Results and Discussion

Clinical studies have shown that cases of septicemia may be persistent or intermittent. In present study, findings reveals that the (30.9%) out total years were registered by 2014. While it is estimated overall prevalence of severe infection among youngsters living within the u. s. magnified steady from zero.56 cases per one thousand youngsters in 1995 to zero.63 cases per one thousand youngsters in 2000, to 0.89 cases per one thousand youngsters in 2005, with most of this increase because of newborn infection. It is also, prevalence of septicemia in North American country newborns is nine.7/1000 population, non-newborn infants 2.25/1000, and also the rates square measure zero.23 to 0.52/1000 in subgroups of youngsters. Incidence of septicemia has exaggerated over years, in all probability thanks to progressive aging of population, the existence of additional co morbidities and perhaps the liberal use of infection codification, by as well as patients with less severity. however, mortality because infection is clearly decreasing over years, in all probability to improvement in intensive care unit care, though absolute mortality is growing on account of the raise in incidence. Risk factors for infection are the 2 ends of life, male sex, North American nation Negro race, presence of comorbidities and sure genetic variants. Tract infections are the foremost common supply of infection, and, nowadays, gram-positive infections are additional frequent that gram-negative infection in most prospective studies.

Incidence of Neonatal infection may be an important reason for morbidity and mortality of hospitalized newborns and premature infants, infection accounts for fifteen percent of infant deaths. Every 141 babies born within the u. s. every year dies of infection within the initial year of life, with more or less twenty thousand deaths within the time of life (2010) the incidence of baby. Sudan is classed as having created light reach come through. this death rate is sixty per one thousand live births and therefore the under-five mortality is eighty two deaths per one thousand live births. The mortality rate is additionally high starting from thirty four to forty seven per one thousand births.

Table (1): Depicts the Prevalence of Septicemia during Five Years

<table>
<thead>
<tr>
<th>Years</th>
<th>Total of children</th>
<th>Number of cases</th>
<th>Prevalence Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>1206</td>
<td>363</td>
<td>30.9</td>
</tr>
<tr>
<td>2015</td>
<td>5970</td>
<td>304</td>
<td>5.9</td>
</tr>
<tr>
<td>2016</td>
<td>3538</td>
<td>323</td>
<td>9.1</td>
</tr>
<tr>
<td>2017</td>
<td>3395</td>
<td>274</td>
<td>8.1</td>
</tr>
<tr>
<td>2018</td>
<td>4027</td>
<td>381</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Figure 1: the number of age groups of all months of 2014

Figure 2: the number of age groups of all months of 2015
The study concludes that there is a very large disparity between the years of prevalence that the more time progresses the less prevalence depending on health services. It is need to be conducted to involve a national level and assessed the associated factors with septicemic children.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Basic and Medical Science, College of Nursing, Babylon University, Babylon Province, Iraq and all experiments were carried out in accordance with approved guidelines.

References

12. Odetola F , Gebremariam A and Freed G . Patient and


Prognostic Role of ki-67 Immunohistochemistry in Soft Tissue Sarcoma: Review and Meta-Analysis

Aws Rassul Hussein Al-salih¹, Raad Jawad Kadhim Al-Shaibany²

¹Assistant professor/ FICMS (pathology)/ University of Al-Qadisiyah/ College of Medicine/ Department of Pathology and Forensic Medicine / Al-Diwaniyah Province Iraq, ²Assistant Professor/ FICMS (orthopedic)/ University of Al-Qadisiyah/ College of Medicine/ Department of Surgery/ Al-Diwaniyah Province Iraq

Abstract

Malignant soft tissue tumors or soft tissue sarcomas accounts for less than one percent of all malignant neoplasms affecting mankind; however, they include more than 50 types of mesenchymal tumors based on histological. The number of articles dealing with the subject of Ki-67 immunohistochemistry in soft tissue sarcoma is relatively great since the administration of this marker in the field of surgical pathology; however, the big picture about the definite role of Ki-67 in soft tissue sarcoma requires the collection of these data in a single meta-analysis study. Thus, the aim of present study is to review the role of Ki-67 immunohistochemical expression in soft tissue sarcoma using meta-analysis design. Google search engine was used and the following key words were used in a variety of combination: Ki-67, immunohistochemistry, soft tissue sarcoma, prognosis, grading, role of and survival. Inclusion criteria included any article dealing with the immunohistochemical role of Ki-67 in soft tissue sarcoma of any histological subtype or as a group. In the present study we found that moderate and strong ki-67 expression is associated with < 50 % 5 years survival, whereas, weak ki-67 expression is associated with > 50 % survival.

Key words: Ki-67, immunohistochemistry, soft tissue sarcoma, meta-analysis

Introduction

Malignant soft tissue tumors or soft tissue sarcomas accounts for less than one percent of all malignant neoplasms affecting mankind; however, they include more than 50 types of mesenchymal tumors based on histological classification ¹-⁵. Although, the annual incidence rate of these tumors is relatively low (approximately 200000 new cases per year), these tumors are highly aggressive and often associated with metastasis at time of diagnosis and resistance to conventional chemotherapy. In addition, they arise from cells that belong to a variety of cell lines which make the picture more complex ⁶-⁸. Treatment, for that reason, should be tailored according to a constellation of clinicopathological parameters in order to increase survival rate and to improve quality of life of individuals suffering of these horrible tumors ⁹-¹². Currently, a number of prognostic parameters are often used to describe these tumors such as status of surgical resection, size of tumor, histological grade and depth of invasion; however, the best identified indicator to establish tumor prognosis and to define best treatment plan ¹³-¹⁶. Traditional histological grading has been proved to be an effective way in case of soft tissue sarcomas; however, a substantial area of discrepancy between histological grading and biological behavior merits the search for another way to improve grading and hence therapeutic approach to such tumors; of the well known immunohistochemical markers, Ki-67 has been used extensively with this regard ¹⁷. This nuclear and nucleolar protein has been shown to correlate well with somatic cells proliferative activity and it activity is lacking in case of quiescent tissues ¹⁸-²². Therefore, Ki-67 immunohistochemical expression is considered an effective way to establish proliferative
activity of malignant cells in soft tissue sarcoma giving an impression about prognosis and biological behavior in addition to some utilization in supporting the diagnosis of some forms of soft tissue malignancies \(^{23-30}\). It has been shown that high immunohistochemical expression of Ki-67 is correlated to distant metastasis and poor prognosis. Despite the general acceptance that Ki-67 is a helpful immunohistochemical marker in characterization and defining the prognosis of soft tissue malignancies, a consensus about the detailed aspects is lacking such as the correlation of Ki-67 to necrosis, aneuploidy, depth of invasion, histological grade, metastasis and survival rate \(^{23-30}\). The number of articles dealing with the subject of Ki-67 immunohistochemistry in soft tissue sarcoma is relatively great since the administration of this marker in the field of surgical pathology; however, the big picture about the definite role of Ki-67 in soft tissue sarcoma requires the collection of these data in a single meta-analysis study. Since this aggregation of data may disclose some vague aspects about the role of Ki-67 immunohistochemistry in soft tissue sarcoma and may highlight the exact prognostic contribution of this marker. For that reason planning and conductance of this study were justified.

**Materials and Method**

To review data concerning the role of Ki-67 immunohistochemistry in soft tissue sarcoma, Google search engine was used and the following key words were used in a variety of combination: Ki-67, immunohistochemistry, soft tissue sarcoma, prognosis, grading, role of and survival. The aim was to obtain the highest number of published articles dealing with this subject. Inclusion criteria included any article dealing with the immunohistochemical role of Ki-67 in soft tissue sarcoma as a group; whereas, articles dealing with the assessment of Ki-67 activity using methods other than immunohistochemistry or dealing with other categories of malignant tumors (non mesenchymal) or those that deals with individual histological subtype of soft tissue sarcoma, were excluded from the present study. No limitation for time period was regarded and any article published in the web and fulfills the previous mentioned inclusion criteria, whatever the year of publication, was selected. Data were then transformed into a Microsoft Office 2010 Excel spread sheet and analysis was performed using this software in addition to statistical package for social sciences (SPSS) version 23.

**Results and Discussion**

Studies enrolled in the current study are shown in table 1. Study (1) has been carried out by Ueda et al. in 1989 on 34 patients with malignant soft tissue tumors. Study (2) has been carried out by Choong et al. in 1994 on 182 patients with malignant soft tissue tumors. Study (3) has been carried out by Drobnjak et al. in 1994 on 174 patients with malignant soft tissue tumors. Study (4) has been carried out by Rudolph et al. in 1997 on 132 patients with malignant soft tissue tumors. Study (5) has been carried out by Levine et al. in 1997 on 65 patients with malignant soft tissue tumors. Study (6) has been carried out by Aydin et al. in 2000 on 35 patients with malignant soft tissue tumors. Study (7) has been carried out by Hoos et al. in 2001 on 47 patients with malignant soft tissue tumors. Study (8) has been carried out by Sorbye et al. in 2012 on 249 patients with malignant soft tissue tumors. Study (9) has been carried out by Campos et al. in 2013 on 65 patients with malignant soft tissue tumors. In all these studies, with the exception of that of Ueda et al., the method of estimation of Ki-67 immunohistochemical expression was percentage of positive cells out of 1000 tumor cells counted in multiple fields of slides representative of the malignant soft tissue tumor, whereas, the method used by Ueda et al., was based on counting the number of positive cells per 10 high power microscopic fields (HPF), as shown in table 1. Five studies outlined the number of case with corresponding Ki-67 immunohistochemical expression, as shown in table 2. The expression of Ki-67 was considered negative when no cell stained by all studies included in the present meta-analysis; however, the expression of positive results was variable. In some studies, authors refer to positive and negative expression only such as the study of Rudolph et al., others used the system of < 10 %, 10-50 % and > 50 %, such as that of Sorbye et al., and Campos et al., whereas others used more detailed system of < 10 %, 10 - < 25 %, 25 - < 50 %, 50 - <75 % and 75 – 100 %, such as the studies of Choong et al., and Aydin et al. We tried to unify the results in one system and we got the following results: 604 cases out of 663 were positive accounting for 91.1 %, as shown in table 3; the rate of expression was 26.2 %, 33.7 % and 30.1 % as weak (< 10 %), moderate (10-50 %) and strong (> 50 %), as shown in table 4. Two studies described the association between ki-67 immunohistochemical expression, as weak versus moderate and strong, and the 5 years overall survival of
patients with malignant soft tissue tumors, as shown in table 5. In the study of Campos et al., the 5 years survival of patients with moderate to strong Ki-67 expression was lower than patients with weak Ki-67 expression. Similar finding was shown by Sorbiye et al., and the pooled results were that patients with weak Ki-67 expression had more than 50 % chance of achieving 5 years survival, whereas those with moderate to strong Ki-67 expression had < 50 % chance of achieving 5 years survival, as shown in table 5. From clinical perspective, accurate anticipation of the biological behavior of malignant tumors in general and particularly malignant soft tissue tumors, is a pre-requisite in order to establish the best treatment plan and therapeutic approach in those unfortunate patients (12-14). A lot of published articles raised the issue of finding the most prognostic indicator whether or histological associated with malignant soft tissue tumors (39, 40). Nevertheless, with the exception of histological grade, no single indicator has got wide acceptance as the single or the solely dependent factor with this regard. We believe that reviewing all articles dealing with the subject of soft tissue tumor prognosis and biological behavior should be considered with analysis that is directed to a single factor at a time and then get the big picture, as a large number of cases are going to be involved, about any single indicator. Actually we prefer to start with Ki-67 immunohistochemical analysis for several reasons. First of all, immunohistochemistry is available in all hospital laboratories in Iraq and it is relatively cheap technique and easy to be applied to paraffin embedded tissue blocks. The second reason is that, lot literatures found significant positive correlation between histological grade of most soft tissue tumors and Ki-67 immunohistochemical expression and it is well known that treatment of these tumors is based primarily on histological grading beside other characteristics. On the other, thirdly, Ki-67, since discovery and till now is seen in published articles dealing with subject of tumor prognosis (30-38).

Table 1: Studies included in the present study and method of evaluating Ki-67 immunohistochemical expression

<table>
<thead>
<tr>
<th>Study</th>
<th>Author</th>
<th>Years</th>
<th>Cases</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ueda et al.</td>
<td>1989</td>
<td>34</td>
<td>Positive / 10 HPF</td>
</tr>
<tr>
<td>2</td>
<td>Choong et al.</td>
<td>1994</td>
<td>182</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>3</td>
<td>Drobnjak et al.</td>
<td>1994</td>
<td>174</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>4</td>
<td>Rudolph et al.</td>
<td>1997</td>
<td>132</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>5</td>
<td>Levine et al.</td>
<td>1997</td>
<td>65</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>6</td>
<td>Aydin et al.</td>
<td>2000</td>
<td>35</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>7</td>
<td>Hoos et al.</td>
<td>2001</td>
<td>47</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>8</td>
<td>Sorbye et al.</td>
<td>2012</td>
<td>249</td>
<td>percent/1000 cell†</td>
</tr>
<tr>
<td>9</td>
<td>Campos et al.</td>
<td>2013</td>
<td>65</td>
<td>percent/1000 cell†</td>
</tr>
</tbody>
</table>

Table 2: Ki-67 immunohistochemical expression

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>Negative</th>
<th>Positive</th>
<th>&lt; 10 %</th>
<th>10 - &lt; 25 %</th>
<th>25 - &lt; 50 %</th>
<th>50 - &lt; 75 %</th>
<th>75-100</th>
<th>10-50 %</th>
<th>&gt;50 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>182</td>
<td>86</td>
<td>57</td>
<td>30</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>132</td>
<td>126</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>249</td>
<td>16</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>65</td>
<td>26</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Pooled positive and negative rate of Ki-67 immunohistochemical expression

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample size</th>
<th>Negative</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>182</td>
<td>0</td>
<td>182</td>
</tr>
<tr>
<td>4</td>
<td>132</td>
<td>6</td>
<td>126</td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>11</td>
<td>24</td>
</tr>
<tr>
<td>8</td>
<td>249</td>
<td>16</td>
<td>233</td>
</tr>
<tr>
<td>9</td>
<td>65</td>
<td>26</td>
<td>39</td>
</tr>
<tr>
<td>Pooled total</td>
<td>663</td>
<td>59</td>
<td>604</td>
</tr>
<tr>
<td>Pooled rate</td>
<td>----</td>
<td>8.9 %</td>
<td>91.1 %</td>
</tr>
</tbody>
</table>

Table 4: Polled ki-67 positive rate of expression according to system of mild, moderate and strong expression

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample size</th>
<th>Negative</th>
<th>Weak &lt;10 %</th>
<th>Moderate 10-50 %</th>
<th>Strong &gt;50 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>182</td>
<td>0</td>
<td>86</td>
<td>87</td>
<td>9</td>
</tr>
<tr>
<td>6</td>
<td>35</td>
<td>11</td>
<td>4</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>249</td>
<td>16</td>
<td>31</td>
<td>63</td>
<td>139</td>
</tr>
<tr>
<td>9</td>
<td>65</td>
<td>26</td>
<td>18</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Pooled total</td>
<td>531</td>
<td>53</td>
<td>139</td>
<td>179</td>
<td>160</td>
</tr>
<tr>
<td>Pooled rate</td>
<td>10.0 %</td>
<td>26.2 %</td>
<td>33.7 %</td>
<td>30.1 %</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Association between ki-67 immunohistochemical expression and overall 5 years survival

<table>
<thead>
<tr>
<th>Ki67</th>
<th>Campos et al. study</th>
<th>Sorbye et al. study</th>
<th>Both studies</th>
</tr>
</thead>
</table>
|      | Total | 5 years survival * | Total | 5 years survival | Total | 5 years survival | *
| Week | 18     | 9 (50.0 %) | 31     | 20 (64.5 %) | 49     | 29 (59.2 %) |
| Moderate/strong | 21  | 9 (42.9 %) | 202    | 88 (43.6 %) | 223    | 97 (43.5 %) |

Conclusion

Ki-67 immunohistochemical expression is a reliable marker to indicate prognosis in malignant soft tissue tumor and should be taken into consideration when planning to treat patients with such tumors.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Al-Qadisiyah/College of Medicine/department of pathology and forensic medicine / Al-Diwaniyah province Iraq and all experiments were carried out in accordance with approved guidelines.

References

2. Puri A, Gulia A. Management of extremity soft


Seroimmunological Study for Detection of Hepatitis B Surface Antigen among Healthy Blood Donors in Diwaniyah –Iraq

Abdulameer K. Leelo¹, Saeed hilal khudhair², Radhia Hussain Fadel³

¹M.B.Ch.B, MSc, PhD Microbiology University Of Al-Qadisiyah, College of Nursing, Iraq, ²University of Al-Qadisiyah, College of Nursing, Iraq, ³College of Health and Medical Techniques/Kufa, Al-Furat Al-Awsat Technical University, 31003 AL-Kufa, Iraq

Abstract

The aim of the study: was to evaluate the occurrence of HBsAg among healthy blood donors (BD) in Diwaniyah -Iraq by immunoassay. This study includes immunoassay for detection of HBsAg in (26318 BDs, 113 females &.26205 males during 2015 and 27657 of the BDs 27581 males & 76 females during 2016). All blood donors positive for HBsAg are clustered according to the age groups also distributed according to the residency whether rural or urban. HBV The study was carried out from January 2015 till December 2016 for detection of Hepatitis B Virus (HBV) (Hepatitis B surface Antigen HBsAg) by enzyme immunoassay We detected that in Diwaniyah BDs, during 2015 were 39 of them have hepatitis B viral infection (0.149%) of the total BDs, 23 of them from urban area (58.97%) and 16 live in rural area (41.03%). While during the year 2016 the seropositive BDs we find that 44 seropositive for HBsAg represented 0.16 % of the total BDs, 29 BDs live in urban area (65.9%) whereas 15 BDs live in rural area (34.1%) all of them were males and none of the females seem to us infected during 2015 & 2016.

Keywords: Blood donor, Diwaniyah Iraq Hepatitis B Surface Antigen.

Introduction

Chronic hepatitis B virus (HBV) infection remains a serious threat to public health and it is associated with cirrhosis and liver cancer. Transmission of HBV occurs through contact of normal persons with the body fluids, blood or Blood components of an infected person. The World Health Organization approves that all blood donations should be -screened for hepatitis B virus to guarantee blood safety and evade any chance for the transmission of the virus to patients who receive blood or blood components. Particularly in developing countries Hepatitis B virus (HBV) infection is a risk to human health, with the high occurrence. Persons with measurable Hepatitis B Virus surface antigen(HBsAg) for six months intermission are regarded as chronic carriers of HBV. Subsequently worldwide infant vaccination happening nationally in 1992 against the Hepatitis B Virus (HBV), in the past years, vaccination has led to a 70–90 % reduction in chronic HBV infection rates all over the world. The first serological hallmark of acute hepatitis B virus infection an envelope protein on the surface of HBV; called Hepatitis B surface antigen (HBsAg). When circulating hepatitis B surface antigen (HBsAg) is detected usually diagnosed immune response produces anti- HBsAg as part of the normal immune defense mechanism trying to eliminate the infection. Strong humoral and cellular immune reaction, will result in loss of obvious antigenemia and viremia in the infected patients. The IRAQ national occurrence ratio of HBs Ag in the years 2005-2006 was 1.6% and the seropositive rate of anti-HBs antibodies was 17%. Iraq, regarded as a low endemic area for HBV and. The typical mode of infection is transfusions of blood. From the year 2013 till now in Iraq, analysis for HBV is done by ELISA machine in district laboratories. The typical diagnostic specimen used for serological tests of HBV infection is blood. Screening viral antigens
and antibodies can be accomplished on either serum or plasma. Together HBV antigens and antibody are unchanging at room temperature for days, at 4°C for months, and for many years if it froze at -20°C to -70°C.

Materials and Method

The study was accomplished in the (Central Public Health Laboratory in Diwaniyah Governorate from January 2015 till December 2016). Diwaniyah lies 180 km south of Baghdad This study includes immunoassay for detection of HBsAg in (26318 BDs, 26205 males & 113 females. during 2015 and 27657 BDs, 27581 males & 76 females during 2016) (figure1 & 2). All BDs that are positive for HBsAg were clustered according to the age groups (table 1) also distributed according to the residency whether rural or urban (figure 3 & 4). The present study was agreed ethically (the committee of Al Qadisiyah Nursing College).

All blood donors in Diwaniyah (at the Blood Transfusion Center) (BTC) must be completing the immunoassay for detection of HBsAg as a general measure of the World Health Organization aimed to safe blood donation one 9 The thorough history and scientific medical inspection were carried out for all the donors by experienced staff expert to detected donors who are suitable for blood donation. Donors who did not fulfill WHO criteria were omitted from donating blood and hence excluded from the study. At the time of blood donation 5-ml Blood Samples for recognition of HBsAg were collected from the primary blood bag placed in a plain test tube for ELISA (Enzyme-Linked Immunosorbent Assay) testing. The blood samples were run in parallel by ELISA for the detection of HBsAg by fourth-generation ELISA kits (InTec product, INC. (http://www.intecasi.com) for the qualitative detection of HBsAg positive in the serum of BDs and the test technique was done permitting to the manufacturer guidelines (CAT.No.ITP23003).) Any blood samples positive by ELISA for HBsAg were duplication tested using the same ELISA kits. (Were repeating tested to rule out false positivity or contamination). Only those blood samples that were repeatedly immunoassay-positive for HBsAg were regarded as positive. If HBsAg test negative, chronic HBV infection is usually ruled out If HBsAg test positive, the patient is considered HBV-infected. Chronic infection is diagnosed when the HBsAg remains measurable for more than six months.

Results and Discussion

The study was ongoing at January 2015 until December 2016 to recognize the Hepatitis type B Virus surface (HBV) antigen (HBsAg) by enzyme immunoassay test in healthy donors of the Diwaniyah governorate (in middle Euphrates region of Iraq) who are attending Blood Transfusion Center (BTC). (26318 BDs 113 females &.26205 males during 2015 and 27657 of the BDs 27581 males & 76 females during 2016) (Figure 1 & 2). We detected that 39 of Diwaniyah BDs (0.149%) during 2015, infected with HBV (immunoassay positive for HBsAg), 23 of them from an urban area (58.97%) and 16 live in rural area. While, 44 BDs are immunoassay positive for HBsAg represented 0.16 % of total BDs during the year 2016, 29 of them live in the urban area (65.9%) whereas 15 BDs live in the rural area (34.1%). the average of the HBsAg immunoassay positive BDs during the two years is 0.155%. All of the HBsAg immunoassay positive patients were males (none of the infected BDs are females) during 2015 & 2016 (Table 1 & 2). Amini et al, in 2017 said that serologic immunoassay tests are a vital test as first-line for diagnosis and screening for HBs Ag infections. (11). The current study in Diwaniyah governorate which located in the middle Euphrates area of Iraq to diagnose HBs Ag by immunoassay test among blood donors during two-years (2015-2016). (26318 BDs 113 females &.26205 are males during 2015 and 27657 of the BDs during 2016,27581 males & 76 females) we detected that the percentage of HBV infection in Diwaniyah, during 2015 was 0.149% and during 2016 was 0.16 % (average of the two years 0.155%) among BDs none of the females seem to us infected during 2015 & 2016. The rate of HBsAg infection observed in this study is considerably lower than The Iraq national occurrence rate of HBs Ag which was 1.6 %. (12). Al-Rubaye et al (2016) recognized that serological evidence for hepatitis B virus infection in Basra city –Iraq about 2.3% in blood donors and Abdullah & Mohammed (2016) found that (1.94%) of BD was seropositive of HBV infection in the same city which is also higher than Diwaniyah BDs infection rate (13,14). Atallah et al 2011 reported that 0.6% of BDs were positive for HBsAg in Baghdad metropolitan of Iraq which is higher than our result (15). Hussein (2018) in Dohok City –Iraq reported that (1.14%) of the BDs were positive for HBsAg also higher than our finding in Diwaniyah BDs (16). In another country Abdullah (2013). Found that 3.8% of the donated blood units were
positive for HBsAg in Jazan Region of Saudi Arabia that is much higher than our report (17). A similar result in Iran where founded by Boustani et al (2017) reported that HBV infection had the prevalence of (0.14%) among BD (18). Also Mohsenizadeh et al (2017) in Jiroft city (Iran) detected 0.36% of the BD was infected with HBsAg which is slightly higher than our result. (19). On the alternative Yambasu et al (2018) found that 9.7% of blood donors infected with hepatitis B in Sierra Leone which is more higher than HBsAg immunoassay positive BDs in Diwaniyah (20).

Table 1. Characterized the total number & percentage of HBsAg immunoassay positive BDs (during years 2015 & 2016).

<table>
<thead>
<tr>
<th>Year Of HBsAg BDs Immunoassay</th>
<th>Total Healthy Blood Donors</th>
<th>HBsAg positive Male</th>
<th>HBsAg Sero-positive Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>26318</td>
<td>39</td>
<td>zero</td>
</tr>
<tr>
<td></td>
<td>(0.149 %) of total BDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016</td>
<td>27657</td>
<td>44</td>
<td>zero</td>
</tr>
<tr>
<td></td>
<td>(0.16 %) of total BDS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Characterized the dissemination of HBsAg immunoassay positive BDs conferring the areas of residency.

<table>
<thead>
<tr>
<th>The year 2015 HBsAg BDs Immunoassay</th>
<th>The year 2016 HBsAg Immunoassay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>Rural</td>
</tr>
<tr>
<td>HBsAg</td>
<td>HBsAg</td>
</tr>
<tr>
<td>16</td>
<td>23</td>
</tr>
<tr>
<td>41.03%</td>
<td>58.97%</td>
</tr>
</tbody>
</table>

Table 3. Dissemination of HBsAg immunoassay positive BDs according to the age groups during 2015 & 2016.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>The year 2015</th>
<th>The year 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 10-30</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Age 31-50</td>
<td>26</td>
<td>37</td>
</tr>
<tr>
<td>Age More than 50</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Total HBsAg Positive BDs</td>
<td>39</td>
<td>44</td>
</tr>
</tbody>
</table>

Figure 1: Represented healthy BDs during 2015 in Diwaniyah BTC

Figure 2 Total study healthy population in Diwaniyah blood transfusion center during the year 2016

Conclusion

Established on this study, a general trend towards a decline in HBV among BD populace has been perceived within the last some years among Iraqi BD the most vital factor that is accountable for this decline was the starting of the HBV vaccination in 1989 (21). This reduction in HBV infection might also be due to the better alertness of HBV among blood donors.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University Of Al-Qadisiyah, College of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

References

The Effect of the Felder and Silverman Model on the achievement of Students in the Fourth Grade in Chemistry

Ahmed Abdul Hussein Nema¹, Saeed Hussein Ali Al Thalab¹, Fadel Amran Issa¹
¹University of Babylon, college of Basic Education, Department of postgraduate Studies - Teaching Methods of Science, Iraq

Abstract

The research goals to identify the effect of the Fielder and Silverman model on student achievement at the fourth scientific in chemistry, for the sake of achieving the research objective, the researcher formulated the zero hypothesis which states that: There was no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group who will study the Fielder and Silverman model and average scores the control group who will study the way regularity in the achievement test of chemistry. The researcher has adopted a partial experimental design, before to applying the experiment, parity was performed in the following variables. Daily teaching plans and testing the achievement consists of (40) experimental paragraphs (36) of which are multiple choice and (4) articles for the two groups of research and after the implementation of the experiment and correcting the students’ answers, the researcher obtained the data for the experimental group, the control group and the use of appropriate statistical means (T.test) for both samples, the results showed that the students of the experimental group were superior whom studied according to the Fielder and Silverman model on the control group who studied according to the normal method

Key words: Fielder and Silverman model,, achievement, fourth grade students, chemistry.

Introduction

The prompt development witnessed by the present era and the increasing information in various areas of life in general and the educational field in particular, this development has led to a huge spread of modern means and technologies used in many fields of science, this progress is the fruit of science of information and knowledge proceeds derived from the human effort in the field the importance of scientific education as it emphasizes the practical activities practiced in the laboratory and its prominent role in the success of teaching in different science curricula, and became the function of the teacher is one He is responsible for steering, organizing, training, evaluating and managing the classroom. interested in chemistry and taught became one of the important elements in our contemporary life. It enters into all fields and industrial activities. There is no one branch except it is related to the chemistry and its applications, which made its importance a clear feature of the progress of nations. The teaching of chemistry and its subjects requires a high level of thinking, foresight, exploration and mental skills that require knowledge of all new, and the science of chemistry ensures a lot of the minute areas related to the life of the community and in various aspects of industrial, health and scientific as the teaching of the chemistry curriculum to the means of visual images and drawings and shapes to clarify the scientific concepts needed by the teacher, So the method of teaching in the modern concept is the method used by the teacher to guide the activity of students towards learning themselves and use their intellectual abilities in the development of their learning must provide methods, models and methods of modern teaching enables the teacher to interact with students better. The importance of the

DOI Numbers: 10.5958/0976-5506.2019.00777.0
Fielder & Silverman model is taking into account the different learning styles of students, which is a modern model of teaching that helps to solve problems. It is also mentioned that each learner has a preferred pattern of learning used to receive and receive information. Some prefer to learn by working in groups, while students prefer to think and reflect, while others prefer to learn facts and tangible materials in contrast prefer to explore while others tend to verbal information and in contrast prefer visual information, and some of the learners want to learn about Team Workout Stuff.

- The Medical research in the field of neuroscience in ordinary individuals and individuals with brain injuries, the results of specialized studies of the hemispheres of the cerebral hemisphere, which is concerned with the knowledge of the brain, It is longitudinally divided into two asymmetrical halves are not identical the left and the right hemispheres are connected by a group of nerve fibers known as the hard body name where the brain is characterized by hemispheres of different mental functions.

Clinical chemistry and laboratory medicine

In this area and by the famous Swiss doctor Paracels who managed to invent new medicines using the of mineral substances rather than herbs and this act served as a stimulant for the relationship that combines chemistry and medicine, and is considered Paul Erlich of the great scientists who named the father of therapeutic chemistry (chemotherapeutic) The art of treating diseases with drugs, as some doctors know, a drug used in the treatment of sleeping sickness was found to be a red dye (Rad Trypan). A treatment for syphilis, known as Salafarsan, an arsenic, was also discovered. It is the International Federation of Clinical Chemistry Laboratory Medicine (IFCC), established on 24 July 1952 now has 79 full-fledged national societies for clinical chemistry which together account for at least 30,000 chemists worldwide. In addition, the Federation has 35 members of diagnostic companies and related industries the link that provides materials and laboratory medicine services, there are five formally defined objectives of the Union

1 - To promote the vision of clinical chemistry, which goes beyond narrow perception

2 - Transcending the boundaries of one state, one institution, geographical group, culture or language, in the field of clinical chemistry.

3 - Dissemination of information on best practices at different levels of technology and development

4. To complete and strengthen the activities of its members information and guidelines on chemists' learning

5 - Determination of principles dissemination of recommendations to standardize analytical procedures and to interpret results, www.ifcc.org

Methodology

First: Experimental Design:

The research includes one independent variable (Fielder and Silverman) and a dependent variable (collection). Therefore, the pilot design was selected with partial control of the experimental and control groups.

Second: The research community and its design:

The current research community is the fourth grade students in the secondary and intermediate schools of the General Directorate of Education in the province of Babil / Musayyib district for the academic year (2018-2019), which includes at least two divisions of the fourth grade scientific, One of the schools belonging to the Musayyib district. The sample consisted of (30) students in the experimental group and (30) students in the control group

Third: The equivalence of the two research groups:

Before the experiment was started, the researcher tried to compare between the two groups (experimental and control) in some variables that are believed to affect the results of the experiment, and parity with the following variables (age, calculated by months, first grade, IQ test).

Fourth: Control of the Exotic Variables:

To ensure the integrity of the experiment procedures, the researcher investigated the internal factors that are believed to affect the experimental research procedures and then its results. He tried to control these factors or variables so that he can attribute the effect in the variable of the study to the independent variable, The growth factor associated with the experiment is a normal growth for all members of both groups equally, especially
that most of them are about one age old, the factor of experimental waste such wastefulness did not occur during the duration of the experiment, but the traditional absence of cases, which included two sets of search, tool measurement, did not have any effect, because the researcher used the same measurement tools, the differences in the selection of the sample, were selected randomly and avoid the researcher this factor equal two sets of research.

Fifth: Preparation of research requirements:

For the purpose of applying the experiment, the researcher provided some of the requirements, including the scientific material. Therefore, the scientific material that the researcher is teaching in the experimental and control groups was determined during the period of the second course of the academic year (2018-2019). It included two chapters (3rd and 4th) for the fourth grade of science, behavioral goals were formulated. 130 behavioral objectives were formulated according to Bloom’s classification of knowledge (recall, assimilation, application, analysis, composition, evaluation) In order to determine the level of each behavioral goal in the field of knowledge in accordance with the preparations and abilities of students at this stage of study.

Sixth: The research Tool:

- The achievement test: The research requires the preparation of an achievement test to measure the achievement of the students of the experimental group and the control group at the end of the experiment to determine the effect of the independent variable in the dependent variable and the absence of a ready-made test characterized by honesty and stability covering the content specified in the chemistry, Depending on the specific behavioral objectives and content of the course material.

- Determination of test objectives: The achievement test aims to measure the effect of the independent variable in the variable of the fourth grade scientific students in the chemistry that has been taught.

- Preparation of the test plan (table of specifications): The test map was designed to distribute the test paragraphs on the parts of the scientific subject in the light of weights and levels of behavioral goals taking into account the ability of students at this age and time for teaching, ) a paragraph

- Determine the test paragraphs: The researcher identified the total number of test paragraphs in the light of the specification table, and took into account the behavioral objectives to be achieved, the test includes (40) paragraph (36) paragraph, multiple choice and (4) paragraphs article, Suitable for the level of students that age and school and within the time allocated for the lesson and the nature of the subject.

- Formulation of the test instructions: The researcher formulated the instructions for the test of achievement. The following information is included (information concerning the students, the time of the test answer, making sure not to leave any paragraph without answer or choosing more than one answer to the paragraph, which leads to neglect and asked them to read the paragraphs carefully and accurately Circle around the character for the correct alternative.

- Correcting the test paragraphs: The researcher put a standard to correct the paragraphs and gave one degree for the correct answer, and zero for the wrong answer, or abandoned or have more than one alternative, and the degree ranged between (0 - 40).

- The validity of the test: The test is honest if it measures what was prepared for it, and the researcher relied on (virtual honesty, content validity, and the ratio of the agreement to the veracity of the virtual (80%) of the arbitrators, either the honesty of the content of all the test paragraphs is a statistical function, The test of achievement in measuring students of the fourth scientific in chemistry.

Application of the two-stage achievement test:

- The first phase: The experimental experiment for the clarity of the instructions of the test paragraphs and the determination of the time, the student after the preparation of the test and instructions in its initial form, the test was applied to a sample survey non-research sample composed of (30) students of the fourth grade scientific, and the time taken to answer On the subjects of the achievement test by monitoring the average completion time of the first, second and third students of the answer to the terms of the achievement test and the average time of completion of the last three students to answer the test paragraphs and calculate the average time was (44) minutes.
- The second Phase: The test was applied to a sample other than the test sample consisting of (100) students in the fourth grade scientific for the purpose of analyzing the paragraphs of the test and confirm the characteristics of the cykometric,

- The difficulty factor for the test paragraphs: the percentage of students who answered the wrong answer from the paragraph to the total number of students. The difficulty factor was calculated using the difficulty factor equation for the objective paragraphs, and the difficulty level was found to be between 0.50 and 0.77 And (0.37 0.68) for the paragraphs of the essay, so the test paragraphs are suitable for students in terms of difficulty and ease.

- Discrimination factor for test paragraphs: This means the ability to distinguish between the grades of students at the upper and lower levels for the degree measured by the paragraph. Substantive test paragraphs were found to have a discriminatory power of (0.25-0.5) for the thematic paragraphs and (0.32-0.5) for the host clauses.

- The effectiveness of the wrong alternatives: After applying the equation of the effectiveness of alternatives to the responses of students of the upper and lower groups, it emerged that the wrong alternatives to the test scores have attracted a number of students in the lower group more than the number of students in the upper group, Without deleting.

Eighth: Test’s Stability:

The stability coefficient is the statistical indicator on the accuracy of the measurement. The stability coefficient was then calculated using the Kiodrichshadon-20 equation because it is the measure of the internal consistency of the test. The coefficient of correlation (0.84) and this indicates that the test has a high degree of stability.

Ninth: Application of the research tool:

A week prior to the test, the students of the two research groups were notified after the completion of the course. The researcher conducted the test at the same time within the pre-defined material.

Tenth: statistical means: The researcher used the statistical means, including the test (T. test) of the independent samples to establish parity between the experimental group and the control group, Pearson correlation coefficient.

Results And Discussion

The results showed that the students of the experimental group who studied according to the Fielder and Silverman model were superior to the students in the control group who studied according to the usual method in the achievement test. Table (2) below shows this.

<table>
<thead>
<tr>
<th>The variable</th>
<th>Total</th>
<th>No.</th>
<th>SMA</th>
<th>standard deviation</th>
<th>Freedom degree</th>
<th>T Value</th>
<th>Statistical significance at (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The chronological age is calculated in</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>months</td>
<td>Exper.</td>
<td>30</td>
<td>196.2</td>
<td>9.06</td>
<td></td>
<td>0.19</td>
<td>Not statistically significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>194.6</td>
<td>8.58</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marks of the first course</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.089</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Exper.</td>
<td>30</td>
<td>12.23</td>
<td>3.29</td>
<td>58</td>
<td>0.089</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>12.16</td>
<td>2.74</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exper.</td>
<td>30</td>
<td>34.5</td>
<td>9.76</td>
<td></td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>31.46</td>
<td>9.69</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (2) for the two research groups in the chemistry test

<table>
<thead>
<tr>
<th>The group</th>
<th>No. of students</th>
<th>SMA</th>
<th>Difference</th>
<th>Freedom degree</th>
<th>T value</th>
<th>Statistical significance at (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exper.</td>
<td>30</td>
<td>72.76</td>
<td>84.51</td>
<td>58</td>
<td>3.5</td>
<td>2</td>
</tr>
<tr>
<td>Control</td>
<td>30</td>
<td>65.13</td>
<td>74.98</td>
<td></td>
<td></td>
<td>Statistical function</td>
</tr>
</tbody>
</table>

**Conclusion**

The model (Fielder and Silverman) proved its effectiveness within the limits in which the research was conducted in the achievement of students of the fourth scientific in chemistry. Teaching according to the Fielder and Silverman model increases the ability of students to organize and process information so as to achieve student learning according to the preferred pattern.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon, college of Basic Education and all experiments were carried out in accordance with approved guidelines.

**References**

3. Shuwaqfah MM. The use of the Feldar / Silverman model in the improvement and skills of analytical thinking and manual skills in the subject of professional education in the eighth grade students Basic, University of Science - Jordan, college of Graduate Studies. 2015.
4. Ormrod JE. Essentials of Educational Psychology (Big ideas to Guide Effective Teaching) Virginia Tech. 2015.
The research is aiming to identify the effect of reading instruction on Skamper’s strategy in developing the habits of the mind for the fourth grade students. In order to achieve the goal, the researcher put the zero hypothesis, which states: There is no statistically significant difference at the level of significance (0.05) among the average of the students of the experimental group, the average score of the students of the control group who will study according to the usual method in the test habits of the mind, and to verify the application of his experience in the first half of the academic year (2018-2019). The sample consisted of (65) students of the fourth grade in Al-Jawahiri secondary school, they were randomly distributed (33) students in the experimental group and (32) students of the control group. The two groups were rewarded in the following variables: age, IQ, and linguistic ability test. The researcher constructed the paragraphs of the habits of the mind in the form of positions and each position containing four alternatives to answer (A, B, C and D) and the number of positions sixteen positions where each position is usually a mental

Introduction

The neglect of the use of mind habits causes many shortcomings in the results of the scientific process, habits are not the possession of information, but is to know how to work on it and use it. It is a pattern of intelligent thinking behaviors that leads the learner to the product of knowledge as a result of responding to certain patterns of skills, values and attitudes, not just remembering them, that failure to take into account patterns of brain sovereignty in education is reflected negatively on students’ tendencies habits, attitudes, and attitudes. Most learners seem to recognize that most schools and universities do not take into account patterns of brain sovereignty. The communities and individuals are realizing that they needbetter thinking. This part of better thinking requires creativity. Creativity is a combination of imagination and scientific effort to develop an old idea or to find a new idea, no matter how small. The definition of thinking skills often includes habits of mind or thinking behavior, which translates trends and assumptions of good thinkers. Researchers such as Bayer, Marzano, Costa, Berknes and Debono believe that students can learn thinking and thinking strategies. Mmaajolhm more effective creativity and more specialized in information processing, and display the mind or Altvkira behavior in the different activities of everyday life habits. Dewey has defined the habits of the mind that require development to achieve understanding (saying: vigilance, perseverance and curiosity, fundamentals must be developed, immobility, intolerance, intense emotion and chatter are harmful habits). He stressed that training in thinking skills is not enough to develop successful thinkers with deep thinking. The habits of the mind, and education puts the development of the mind and the regulation of mental habits above all that we seek. Knowledge, as Koffka says, “is not the best of what educational institutions have learned, but it is our attribution to the right thinking and to take intellectual independence to act in positions”

Key words : Skamper’s Strategy, fourth grade students, habits of mind, development

Corresponding author:
Salem Nadhim Nasser
University of Babylon – college of Basic Education, Department of Post-Graduate Studies, Iraq; E-mail: Salam.nathem.s@gmail.com
Dewey also says that the most important function of the Breeding is the breeding habits of the mind and the correct thinking and rooting. And that the first steps to develop mental habits is to create strong motivation and desire of the student to make a change in the pattern of thinking, and to feel that he needs to develop his mental habits and this requires the teacher to find appropriate strategies for events. Modern trends emphasize the need to activate effective teaching strategies and methods in the educational process that increase the role of the active learner and achieve an integrated and comprehensive growth in all aspects of his personality to be an active focus in the educational process. This study was conducted to find out as there was a difference between the experimental group taught in accordance with the Skamper’s strategy students and between the control group taught in accordance with the usual way students.

Methodology

It includes a presentation of the procedures that have been carried out to achieve the research objectives, starting with the research methodology and experimental design, defining the research community and its design, the equivalence of the research groups (experimental and control), preparation of the research requirements and tools. Experimental design of the research includes the independent variable (Skamper’s strategy), the normal method, and the dependent variable (the development of the habits of the mind). Therefore, the researcher used experimental design with partial control of two equal groups, one experimental and the other controlling. The research community and its model: The current research community represents fourth grade students, all of them in the governmental day-school preparatory school of the Directorate General of Education in Diwaniyah Governorate for the academic year 2018-2019. In the same case, the researcher chose the middle school of Diwaniyah in the center of Diwaniyah province in order to conduct his research. It was found that it includes two divisions for the fourth grade (A, B). The researcher chose (a) the random drawing method (the drawing method) to represent the experimental group and the number of its students (33) students who will study their students according to the (Skamper’s strategy), the same way the researcher chose randomly Division (b) to represent the control group and the number of students (32 students), which will examine its students according to (the usual way). The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment. Although the researcher chose the two groups in the random drawing method, although the students of the research sample from the social and economic center are very similar and study in one school. But he was keen to make the equivalence of the following variables: the age of time calculated months, the test of intelligence, the test of language ability), as the researcher parity between the two research groups in the variables mentioned above and showed the results according to the table.

Adjusting Exotic Variables:

Although the researcher verified the equivalence of the two sets of research in some variables that are believed to affect the course of the experiment, he tried to avoid the effect of some of the extraneous variables in the course of the experiment and some of these variables and how to control them: Accidents associated with the experiment: The sample was selected: The two sets of research were chosen in the logical way and the two groups were confirmed. The maturity factor: Since the duration of the experiment is uniform between the two research groups As well as the approximate age of students B in the two groups, so what happens growth will return to the members of the two groups at the same level, so it was not for this factor is the impact of the research, the impact of the experimental procedures: the work of the researcher to reduce the impact of the experimental procedures could affect the dependent variable during the course of the experiment. Preparation of research requirements: The research requirements of the basic things on which the research is based on which the search procedures are implemented and these requirements are: Scientific material (content): The scientific material that the researcher has been taught. For the students of the two groups of research during the duration of the experiment (the second semester) of the academic year (2018 - 2019). The scientific article included seven topics of the book of reading material for the fourth grade literary, I 6, for the year 2014 AD Author: Karim Obeid Al-Waeli et al. ). The researcher prepared 7 plans for the experimental group, which is taught according to (Skamper strategy) and the same to the control group, which is taught according to (the normal method). The tools and methods used to develop the habits of mind according to Skamper strategy.
Research Tool: A measure was prepared to measure the habits of the mind:

The researcher constructed the paragraphs of the habits of the mind in the form of positions and each position includes four alternatives to answer (A, B, C and D) and the number of positions sixteen position, as each position is usually a mentality.

A - The validity of the paragraphs of the habits of the mind (the analysis of the paragraph)

The logical analysis is the general appearance of the scale as a means of mental measurement, since the presentation of the paragraphs of the scale to a group of arbitrators to judge their validity in measuring the property to be measured is a kind of honesty to which the apparent honesty applies. (Moss, 1994,204) The researcher verifies the validity of the paragraphs by presenting the scale to a group of specialized arbitrators in educational and psychological sciences to benefit from their observations and opinions in the amendment and delete what they see as inappropriate, so I got the proportion of agreement (96%)

B - The honesty of the building

And this type of honesty, which illustrates the relationship between the theoretical basis of the test and the paragraphs of the scale in its fields, has achieved this truth by applying it to (40) students of the fourth grade literary and the calculation of correlation coefficients between the degree of each position and the total score, (0.62_0.84), and the significance of correlation coefficients. The T value of the correlation coefficient of each paragraph was computed and compared with the tabular T value of (2.021) at the significance level (0.05) and the degree of freedom (38).

Spatial Application of the Habits of Reason Scale:

The researcher applied the scale to a sample of 30 students randomly selected from the Diwaniyah prep school for boys in order to know the clarity of the instructions of the 16 habits of the mind, as well as calculating the time taken to answer this scale. His answers were clear and the average time to answer all the paragraphs was (55) minutes.

Paragraph Analysis (Statistical Analysis):

The process of analyzing paragraphs is statistically defined as the study of evaluating their effectiveness through the students’ response to the scales. The aim of this procedure is to keep the good paragraphs in the scale.

Extraction of discriminatory power of paragraphs:

The distinction of a paragraph is strongly meant to distinguish between higher-level, lower-level, or test-measured subjects whose usefulness is to clarify the differences between the most capable individuals and the weaker individuals, after calculating the power of discrimination of each paragraph, using the equation of discrimination of paragraphs, the researcher found that the forces of discrimination were limited between (0.31 - 0.53), as Ebel believes that the paragraphs of the test is good if the strength of the distinction (0.30) and more, The test is all good, and acceptable.

The relation of the paragraph to the total degree of the scale:

To obtain the coefficient of excellence by using the total score of the scale as an internal check, ie to obtain the correlation between the degree of each paragraph and the overall score of the test in general, the higher the correlation between the paragraphs and the overall score increased the possibility of getting more homogeneous sections in the measurement of what was measured for The weak paragraphs should be excluded.

This method was used in the psychological tests because it is a reference to the homogeneity in the paragraphs that measure any behavioral phenomenon and this means that each of the paragraphs of the test going in the course of the test as a whole.

The Stability of the scale:

The validity of the measurement depends on the stability of its results. The fixed scale gives the same results almost as measured the same property to be measured consecutive times, the researcher used the following methods to extract stability:

1- Test-Retest method

To achieve the stability of the scale according to this method, the measure of the habits of the mind was applied on Wednesday 12/12/2018 to a sample of students consisting of (30) students randomly selected
from Diwaniyah middle school students and 15 days after the first application. The scale was applied again on the same sample on Thursday, 27/12/2018. The correlation between the students’ grades was calculated using the Pearson correlation coefficient and the stability coefficient value of the total scale was 0.88. For the correlation coefficient, the T test was used, (35.773), which is greater than the scale of the elbows (2.084) at the level of significance (0.05) and degrees of freedom (28). Alpha-Cronbach’s stability coefficient (for internal consistency):

The persistence of the Vaccronbach method depends on the consistency in the stability of the results of the individuals for all the paragraphs of the scale. To calculate the stability of this method, 20 random forms were withdrawn from the analysis sample of the vertebrates and the Vecronbach equation was applied to the internal consistency.

The final view of the measure of the habits of the mind and how to correct it:

The scale consists of sixteen cards each representing one area for each of the habit of the sixteenth mind. 16. The paragraphs of the scale were formulated in the form of positions, from each position, four alternatives (A, B, C and D) (4) degrees, (b) give (3) degrees, (c) give (2) degrees, while (d) the lowest degree of common sense and give it a score. Every habit of mind habits and how to correct it.

Application of the research tool: The experimental and control groups were informed of the date of application of the habits of the mind standard a week before it was carried out. It was applied after the completion of teaching the specific material for the two research groups at one time.

Statistical methods: The researcher used the t - test equation for two independent samples to make the parity between the experimental and control groups, Pearson’s correlation equation, the alpha - cronbach equation, and the spss.

Results and Discussion

The results showed statistically significant differences between the experimental and control groups in the development of the habits of the mind and can be explained as follows: The students of the experimental group that studied according to Skamper’s strategy surpassed the students of the control group which were studied in the normal way in the development of the habits of the mind in the post-test. This shows that teaching according to Skamper’s strategy had a positive effect on the development of the habits of the mind.

Table1. Statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment.

<table>
<thead>
<tr>
<th>The variable</th>
<th>Group</th>
<th>Size of sample</th>
<th>Average Arithmetic</th>
<th>The difference</th>
<th>Freedom degree</th>
<th>T value</th>
<th>Level of indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age counted by months</td>
<td>Exper.</td>
<td>33</td>
<td>189.73</td>
<td>29.637</td>
<td>0.893</td>
<td></td>
<td>Not statistically significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32</td>
<td>188.66</td>
<td>16.875</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td>Exper.</td>
<td>33</td>
<td>26.79</td>
<td>57.729</td>
<td>0.384</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32</td>
<td>26.13</td>
<td>38.564</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The language ability</td>
<td>Exper.</td>
<td>33</td>
<td>8.58</td>
<td>7.065</td>
<td>0.020</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32</td>
<td>8.56</td>
<td>7.155</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

Skamper’s strategy has a positive impact on the development of the habits of the mind to the fourth grade students and increase their ability to understand information, facts and knowledge and raise their academic level. The Skamper strategy has a role in making students the focus of the educational process through their active participation in the educational situation, which will increase their self-confidence and encourage them to persevere to raise their level of science.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, college of Basic Education and all experiments were carried out in accordance with approved guidelines.

References

4. Shawahin, Khair Suleiman, 2015, teaching creative thinking and school curricula, I 1, the world of books for publication and distribution, Irbid
The Impact of the Information Gap Strategy Academic Achievement of first grade students of Intermediate school In (Sciences)

Ali Radha Mujid, Saeed Hussein Ali Al-Thalab, Abdul Amir Khalf Arat

Abstract

The research aims to identify the impact of the information gap strategy in the achievement of students in the first grade intermediate in sciences, in order to verify the objective, the researcher has put the zero hypothesis which states: There was no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group according to the information gap strategy and the average scores of students in the control group who will study according to the usual method of testing the achievement of science, to be verified, he applied his experience in the second half of the academic year (2018-2019). The research sample consisted of (53) students of first grade intermediate in sciences. They were randomized to two groups. The number of students in the experimental group was 27 and the number of students in the control group was 26. The two groups were rewarded in the following variables (age, IQ test, grade 6). The results were then analyzed and showed the superiority of the experimental group students who studied according to the information gap strategy on the control group who studied the normal way in the achievement variable.

Key words: Information Gap Strategy, First Grade Students, Sciences, Achievement

Introduction

The Biology is one of the most diverse sciences and is related to other sciences because it deals with all forms of life on the earth, as it is connected with all aspects of human life, it is necessary to take care of this science and teach it to students in modern ways and methods through which it can employ the information and knowledge gained in its daily life. Biology is concerned with the study of organic organisms from the organic point of view and adapting them to the environment in which they live. Hence, its strong relationship with education is manifested in the knowledge of the laws of public life, growth and adaptation, which in turn led to a biological trend in education.

Especially with respect of focusing on the concept of adaptation based on the existence of an internal motive seeks to adapt the organism with the demands of the environment surrounding the various aspects of which are the essence of life, as education cannot ignore the biological side of the learner there are differences between learners regarding the strength of their eyes or sharpness heard, Or the soundness of their pronunciation and maturity of their nervous systems and the growth of their brain cells, the formation of their physical structure, and therefore dealing with them taking into account these differences. The modern trends emphasize the need to activate effective strategies and teaching methods in the educational process, The role of the active learner, achieve an integrated and comprehensive growth in all aspects of his personality, to be an active focus in the educational process, the principles of science education according to the vision of the Research Council Science education is an active process, and learners must be actively helped to understand it through individual and group activities during learning, and the

DOI Numbers: 10.5958/0976-5506.2019.00779.4
need to encourage students to participate fully in science learning.

The use of diverse teaching strategies. In encouraging students to participate in activities that lead them to discuss and ask questions about the content of the course, we are not only working to maintain the best information about the subject matter. But also help develop their thinking abilities. Learning occurs at a better level when students work in collaborative groups for the integration that occurs between students’ ideas and the solutions they reach. They speak the same language and can translate words Difficult and ambiguous expressions and the use of language that can be understood.

As such students in all levels of education are seeking to achieve a high level of academic achievement. Therefore, the achievement of education is very careful in educational research in general and psychological research in particular. Achievement is one of the most important outcomes of the educational process. As they seem to each other but reflect and speak of many vital things important to the student. Achievement is one of the important aspects of mental activity carried out by the learner in the school as a cognitive variable that includes all that can reach the learner’s ability to learn and his ability to express what he learned.

This makes teachers look for the best ways and modern strategies that are more useful in teaching science in general, he has been found that methods that may contribute to a broader understanding of science and achieve many of the objectives of teaching at the secondary level, he has used of active learning strategies including (information gap strategy). Because it is a modern strategies that may help in overcoming the problems that hinder students’ understanding of science and raise the level of their collection. Moreover, this strategy has not been put into practice in the teaching of science for the secondary stage, Therefore, this study was conducted to find out if there was a difference between the students of the experimental group who are taught according to the information gap strategy and the students of the control group that are taught according to the normal method.

Methodology

Includes an overview of the actions taken to achieve your search goals starting with the research methodology and experimental design, to identify and identify the research community, and the equivalence of the two research groups (Experimental and control), the preparation of search tools and tools, application procedures and display the statistical means used, that will be displayed as follows:

The experimental design of the research: includes the independent variable (information gap strategy) and (normal method) and the dependent variable (collection). Therefore, the researcher used experimental design with partial control of two equal groups, one experimental and the other control.

The research community and its sample:

The current research community represents all middle-grade students in secondary and intermediate schools. Governmental Day belongs to the Directorate General of Education in the province of Qadisiyah (Center) for the academic year (2018 - 2019), Which is not less than the number of the people of the first row, the average of two divisions. In the same research, the researcher (middle science) in the center of Qadisiyah province chose randomly to conduct his research. It was found to consist of four divisions of the first intermediate grade (A, B, C, D). The researcher selected a (a) random drawing method (the drawing method) to represent the experimental group and the number of students (27) students, which will study their students according to (information gap strategy), in the same way the researcher randomly selected Division C to represent the control group and the number of students (26) students, which will study the students according to (the usual method).

The equivalent of the two research groups:

The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment. Although the researcher of the two groups was chosen in a random drawing method. Although the students of the research sample are from a social and economic center. They are very similar and are taught in one school, but was keen to make the equivalence of variables (The age of time is calculated in months, Grades of the previous school year (sixth primary), IQ test). The researcher the equivalent of the two research groups the variables mentioned above and the results were shown as in the following table 1.
Adjusting Exotic Variables:

Although the researcher verifies the equivalence of the two groups in some variables which is believed to affect the course of the experiment, however, he tried to avoid the effect of some exotic variables in the course of the experiment and some of these variables and how to adjust them: (Accidents associated with the experience:

EXPERIMENT EXPERIENCE: You did not get interrupted or moved for any student throughout the experiment, sample selection: The two groups were randomized and verified of the parity of the two groups, the maturity factor: Since the duration of the experiment is uniform between the two research groups. As well as the approximate age of students in both groups so that the growth will return to the members of the two groups the same level, so this factor has not affected the search.

Effect of experimental procedures: The researcher worked to limit the effect of experimental procedures which can affect the dependent variable during the course of the experiment).

Preparation of the research requirements:

The research requirements are essential on which the research is based and according to which procedures are carried out the research. These are:

Scientific material (content): The scientific material that the researcher is teaching has been determined for the students of my group, the research during the duration of the experiment (second semester) of the academic year (2018 - 2019) AD, prepared by the researcher (16) A plan for the experimental group to study on (Information Gap Strategy) and its counterpart to the control group which is taught according to (the normal method). The research requirements: The “Collective Test” has been prepared according to the following steps:

Determination of the purpose of the achievement test:

The objective of the achievement test is to measure the achievement of students in the first intermediate grade (information, skills and experience) in science in the study of biology and technology, building the body of the organism, genetics and evolution.

Determination of Behavioral Goals: After the purpose of the test was determined, behavioral objectives are determined to determine the extent of their achievement. The researcher formulated a number of behavioral goals.

Determining the test paragraphs: The researcher prepared a specification table and a test map. In light of this, 40 test cases were identified.

The test subjects were formulated in the initial form in the light of the experimental map. The researcher chose the type of test (multiple choice) which is one of the best objective tests. The test consisted of (40) Understanding, application, analysis).

The test instructions: Specific instructions and guidelines have been formulated on how to answer (Selecting one correct alternative to the paragraph, answering all paragraphs,

Correcting the test answers: A standard was set for correcting the answers. One score for each correct test paragraph and 0 for the wrong answer, the left paragraph that the student did not answer, and the paragraph for which more than one choice was given. Therefore, 40 degrees) and the lowest score (zero).

The validity of the test: it was confirmed by the veracity of the test and the validity of the content. The results showed that the apparent honesty obtained 80% of the agreement by the arbitrators and specialists. As for the validity of the content, the results showed that all the clauses of the test are statistically significant. In measuring the understanding and comprehension of students in the first grade intermediate in science.

The application exploration for the achievement test: and include what comes:

The first survey application: In the first phase of the survey, the achievement test was applied to a group of students of the first grade of the non-research sample. The number of students was 30 students. The purpose of this test was to know the clarity of the test instructions and guides, For the test, the researcher recorded the exit time for each student. In calculating the arithmetic mean of time, it was found that the time required to answer all the test paragraphs was (43) minutes.

The second survey application: The test was applied to a sample of (100) students in the first row of the average non-research sample. The purpose of this test is to analyze the statistical achievement test paragraphs.
The Statistical analysis of the test scores: The test scores were analyzed as follows:

**The difficulty of the paragraph:** The statistical analysis of the terms of the test of achievement found that the coefficient of difficulty of paragraphs ranged from (0.28 - 0.43) and thus all the test scores are acceptable and their difficulty is appropriate.

**The distinction of the paragraph:** The important characteristics that must be provided in the paragraphs of the test is the characteristic of discrimination and means the possibility of items or paragraphs to identify individual differences of students and the test items are valid as the coefficient of discrimination of items is (20,0) and above, Between 0.30 - 0.70), thus the subjects of the achievement test have a good and appropriate discrimination coefficient.

**The effectiveness of the wrong alternatives:** The researcher conducted a statistical analysis (highest 54% and lowest 54%) degree to find the effectiveness of the wrong alternatives ranging from (-0.01 - 0.22) and it turned out that the alternatives of the test paragraphs are all effective and thus the collection of all appropriate.

**Application of the research tool:** The experimental and control groups were informed of the date of application of the test, one week before it was carried out, and it was applied after the completion of teaching the specific material for the two research groups at one time. The researcher supervised the application of the test.

**The Statistical methods:** The researcher used the t-test equation for two independent samples to make the parity between the experimental and control groups and the Pearson correlation equation. The researcher used the equation to correct the correlation coefficient between the test segments (individual and marital scores) after the Pearson correlation coefficient, The spss program, the Microsoft Excel 2007 program (Excel)

**Results and Discussion**

The students of the experimental group who studied the information gap strategy outperformed the students of the control group who studied the usual method in both the achievement test and the motivation test towards the substance.

<table>
<thead>
<tr>
<th>Table 1. The equivalent of the two research groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>The variable</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Age calculated in months</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Marks of first attempt</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Intelligent test</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Table 2. The results show that the experimental group is superior to the control group.**

<table>
<thead>
<tr>
<th>The statistical The group</th>
<th>No.</th>
<th>SMA</th>
<th>standard deviation</th>
<th>Difference</th>
<th>Freedom degree</th>
<th>T value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>27</td>
<td>33.96</td>
<td>3.84</td>
<td>14.75</td>
<td>51</td>
<td>8.64</td>
<td>2.1</td>
</tr>
<tr>
<td>Control</td>
<td>26</td>
<td>24.88</td>
<td>3.81</td>
<td>14.52</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The researcher supervised the application of the test.
Conclusion

The research sample consisted of (53) students of first grade intermediate in sciences. They were randomized to two groups. The number of students in the experimental group was 27 and the number of students in the control group was 26. The two groups were rewarded in the following variables (age, IQ test, grade 6). The results were then analyzed and showed the superiority of the experimental group students who studied according to the information gap strategy on the control group who studied the normal way in the achievement variable.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of postgraduate Studies, college of Basic Education, Babylon University, Iraq and all experiments were carried out in accordance with approved guidelines.

References

**FTO rs17817449 Gene Polymorphism as a Predictor for Maternal Obesity in Iraqi Pregnant Women**

Shahla O. Al-Ogaidi¹, Sura A. Abdulsattar¹, Hameed M. J. Al-Dulaimi¹

¹Department of Chemistry, College of Science, Mustansiriyah University, Baghdad, Iraq, ²College of Medicine, Mustansiriyah University, Baghdad, Iraq, ³College of Biotechnology, Al-Nahrain University, Baghdad, Iraq

**Abstract**

**Background:** The prevalence of overweight and obesity is rising worldwide, particularly, among women of reproductive age. *FTO* gene is one of these genes that increase susceptibility to obesity. The goal of this study was to analyze the association between the *FTO rs17817449* SNP with maternal obesity and metabolic biomarkers in Iraqi pregnant women. Women were divided into 2 groups according to BMI: Overweight/Obese (BMI> 24.9) and control (BMI<24.9). Genotyping of *FTO rs17817449* SNP was determined by tetra-primer ARMS–PCR. Metabolic biomarkers included fasting glucose FG, glycated hemoglobin HbA1c, lipid profile, fasting insulin, leptin LEP, leptin receptor LEPR, LEP/LEPR ratio, and HOMA-IR. Statistical analysis revealed that participants with the homozygous mutant (GG) genotype significantly increases the odds of being overweight/obese (adjusted OR: 3.972, CI 95% 1.209-13.048, P= 0.023) and each copy of risk allele (G) is associated with overweight/obese (OR: 2.6258, 95% CI: 1.4025-4.916, \( P=0.0026 \)). *FTO* rs17817449 SNP was associated only with higher maternal BMI, TC, LDL-C and LEP/LEPR among the study group. While among overweight/obese group, *FTO* rs17817449 SNP only associated with increased TC, LDL levels, and BMI

**Keywords:** Body mass index, FTO gene, Pregnancy, Maternal obesity, Insulin, Leptin receptor, Leptin, Tetra-primer ARMS–PCR.

**Introduction**

One of the major public health problems of 21st century is the epidemic of obesity across all spectrums of age groups¹, in particular, among reproductive age women². Overweight and obesity during pregnancy are well-known risk factors for adverse pregnancy outcomes for both for mother and infant²-³. According to Iraqi Mistry of health, 30.6% of Iraqi adult females were overweight and 42.6% of them were obese⁴. Obesity susceptibility is thought to result from a combination of environment, genes and behavior⁵. Hundreds of genes were recognized as contributing to obesity⁶. Fat mass and obesity associated (*FTO*) gene is one of these genes⁷. *FTO* gene is expressed, mainly, in the hypothalamus⁸. It has been speculated that the *FTO* gene leads to an increased risk of obesity by influencing a central regulation of food intake⁹. To elucidate the role of *FTO rs17817449* single nucleotide polymorphism (SNP) in maternal obesity, we performed a case–control study association study in a population of Iraqi pregnant women. We also tested the association of this SNP with body mass index (BMI) and metabolic biomarkers including: two obesity related hormones; insulin and LEP, leptin receptor (LEPR), homeostasis model assessment-insulin resistance (HOMA-IR), fasting glucose (FG), glycated hemoglobin (HbA1c) and lipid profile.

**Materials and Method**

The current case-control study consists of 100 pregnant women enrolled at Al-Eluia Teaching Hospital in Baghdad, Iraq for delivery between February and May 2017. Two main groups included, 68 pregnant women ageing 18-49 years with abnormal BMI (greater than or equal to 25 kg/m²) served as patients (Overweight/
Obese) group and 32 pregnant women ageing 18-35 years with a normal BMI (below 25 kg/m²) served as controls. Smoking women and women with complicated pregnancies were excluded such as having hypertension, diabetes, and infection diseases. For BMI calculation, anthropometric measurements such as weight and height were recorded after delivery. BMI was defined as weight in kilograms to square of height in meters\(^2\).

As for metabolic measurements, FG and Lipid profile were determined by colorimetric, enzymatic method using kit supplied by Biosystems, Spain and LINEAR CHEMICALS S.L, Spain. Friedewald equation was used for LDL-C and VLDL-C estimation\(^1\). Quantitative measurement of human serum levels of LEP, insulin, and LEPR performed using an ELISA kits supplied by KOMA BIOTECH INC. Korea, Monobind Inc., USA and My Biosource, USA respectively. Matthews formula was used for calculation of HOMA-IR, which is a method used to quantify insulin resistance\(^12\). Fluorescence immunoassay (FIA) system with iCHROMA™ Reader was used for quantitative measurement of HbA1c.

### Genotyping

Genomic DNA was isolated from EDTA whole blood samples using the gSYNC™ DNA Extraction Kit provided by Geneaid Biotech Ltd, Taiwan according to the manufacturer’s protocol and stored at –20 °C. A simple and economical SNP genotyping method named tetra-primer amplification refractory mutation system–PCR (ARMS–PCR) was used for genotyping. The tetra-primer ARMS–PCR uses four primers in a single PCR to determine the genotype\(^13\). Genotyping of FTO rs17817449 SNP was performed by tetra-primer ARMS–PCR as previously described\(^14\).

### Statistical analysis

Statistical Package for Social Sciences (SPSS Inc. Chicago, IL, USA, version 19.0) was used for data analysis. The qualitative variables were expressed as absolute numbers and frequencies while quantitative variables were expressed as means±standard deviation (SD). Distributions of alleles and genotypes were compared among patients and control groups by Chi-square (\(\chi^2\)) test, calculating the odds ratio (OR) and 95% confidence interval (CI). General Linear Model (GLM) adjusted for maternal age was conducted to analyze the impact of FTO rs17817449 SNP on anthropometric and metabolic biomarkers of obesity. A value of <0.05 was considered statistically significant. To determine whether observed genotype frequencies are consistent with HWE, Web-ASSOTEST - a web-based version of ASSOTEST available on www.ekstroem.com\(^15\).

### Findings

The Tetra-ARMS PCR product of FTO (rs17817449) gene polymorphism was analyzed by 2% agarose gel electrophoresis. The two outer primers generated a product size of 313 bp which represents the internal standard. T allele generated 221 bp product-size, while, G allele generated 148 bp product-size as shown in Figure 1. We randomly selected 24% of the samples for re-genotyping, to detect any genotyping errors. The obtained results were 100% identical.

For the control samples, the genotype distribution for the FTO rs17817449 SNP was in HWE (\(P=0.123\)). Genotypes and alleles frequencies for FTO rs17817449 SNP for both groups are presented in Table (1).

In patients group, the frequency of the homozygous mutant (GG) genotype of the FTO rs17817449 polymorphism was (36.8%) higher than that of the homozygous wild type (TT) (27.9%) or heterozygous (GT) (35.3%) genotypes. On the contrary, control group had homozygous wild type (TT) frequency was (53.1%) higher than that of heterozygous (GT) genotypes (31.3%) or of homozygous mutant (GG) genotype (15.6%). In other words, both of GG and GT genotypes distribution were significantly higher (\(\chi^2 = 7.350, P=0.007\)) in patients group compared to control. Moreover, statistical analysis revealed that participants with the homozygous mutant (GG) genotype significantly increases the odds of being overweight/obese (adjusted OR: 3.972, CI 95% 1.209-13.048, \(P=0.023\)). In contrast, heterozygous (GT) genotype was not associated with increased risk for obesity (adjusted OR: 1.972, CI 95%: 1.072-6.501, \(P=0.026\)). The minor allele frequency (MAF) of rs17817449 (G) allele was 0.5441 significantly (\(\chi^2 =9.37, p=0.0022\)) higher in patients vs, 0.3125 in controls. Each copy of G allele significantly increases odds of being overweight/obese (OR: 2.640, CI 95%: 1.072-6.501, \(P=0.026\)).
The impact of FTO rs17817449 SNP on anthropometric and metabolic biomarkers of obesity adjusted for maternal age across study population is presented in Table (2). Assuming codominant model of inheritance, the FTO rs17817449 SNP was associated ($P<0.05$) with higher BMI, TC, LDL-C. Furthermore, assuming the dominant model, (GT+GG) females carriers have a significantly ($P<0.01$) higher BMI, TC, and significantly ($P<0.05$) higher LDL-C and LEP/LEPR ratio compared to TT genotypes carriers among the entire study group. Further statistical analysis revealed (data not shown) that rs17817449 SNP only significantly associated with increased TC, LDL levels, and BMI across patients (overweight/obese) group. On the other hand, there were no significant differences in means of FBG, HbA1C, TG, HDL-C, VLDL-C, LEP, LEPR, and HOMA-IR between the genotypes of FTO rs17817449 polymorphism. Since 2007, more studies have confirmed the association between SNPs within the first intron of FTO gene and BMI in several distinct populations, specifically European, Asian, Africans and Native Americans, making FTO the single strongest contributing genetic factor to obesity, with huge implications for public health. Moreover, the link between the FTO gene rs17817449 SNP and obesity has been confirmed in several populations. The rs17817449 variant of the FTO gene was first identified by Dina et al. in 2007 as strongly associated with early-onset and severe obesity for the G allele. However, in a recent study among Saudi population, the frequency of the G allele was more pronounced among non-obese, males and females, than obese subjects, while T allele was more pronounced among obese males and females, than non-obese, suggesting that T allele was significantly associated with obesity. Recent evidence suggested that FTO variants directly affect adipocyte function through targeting IRX3 and IRX5. While some reports suggest that it affects food intake, as carriers of the risk allele tend to choose high energy and palatable food. Furthermore, Laith et al reported that rs17817449 SNP was significantly associated with increased BMI, LDL, insulin and HOMA-IR and a decrease the HDL levels. Leptin circulates in a free and active form and in a bound and inactive form to its plasma bound soluble receptor (sLEPR). Bound LEP (active), represented in LEP/LEPR ratio, appears to be associated with resting energy expenditure. The sLEPR elevated concentrations indicate leptin signaling regulation through high affinity binding of free leptin, preventing its degradation and clearance, but also inhibits leptin-binding to cell surface receptors. Thus, our results might refer to an elevation in sLEPR.

Table 1: Allelic and genotypic frequencies of the FTO rs17817449 gene variant with odd ratio (OR) values among control and overweight/obese patients.

<table>
<thead>
<tr>
<th>Model</th>
<th>Control N(%)</th>
<th>Patients N(%)</th>
<th>Adjusted OR (CI 95%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>17(53.1)</td>
<td>19(27.9)</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>GT</td>
<td>10(31.3)</td>
<td>24(35.3)</td>
<td>1.972 (0.714-5.449)</td>
<td>0.190</td>
</tr>
<tr>
<td>GG</td>
<td>5(15.6)</td>
<td>25(36.8)</td>
<td>3.972 (1.209-13.048)</td>
<td>0.023*</td>
</tr>
<tr>
<td>Dominant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td>17(53.1)</td>
<td>19(27.9)</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>GG/GT</td>
<td>15(46.9)</td>
<td>49(72.1)</td>
<td>2.640 (1.072-6.501)</td>
<td>0.035*</td>
</tr>
<tr>
<td>Recessive</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT/GT</td>
<td>27(84.4)</td>
<td>43(63.2)</td>
<td>Reference</td>
<td></td>
</tr>
<tr>
<td>GG</td>
<td>5(15.6)</td>
<td>25(36.8)</td>
<td>2.893 (0.966-8.663)</td>
<td>0.058</td>
</tr>
</tbody>
</table>
**Cont...** Table 1: Allelic and genotypic frequencies of the *FTO* rs17817449 gene variant with odds ratio (OR) values among control and overweight/obese patients.

<table>
<thead>
<tr>
<th></th>
<th>TT</th>
<th>TG</th>
<th>GG</th>
<th>P* value</th>
<th>Dominant Model (GT+GG vs. TT)</th>
<th>P* value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G/T</td>
<td>Allele</td>
<td>Allele</td>
<td>Allele</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T Allele</td>
<td>44(68.75)</td>
<td>62(45.59)</td>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G Allele</td>
<td>20(31.25)</td>
<td>74(54.41)</td>
<td>2.6258 (1.4025-4.916)</td>
<td>0.0026**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Impact of the *FTO* rs17817449 SNP on maternal SNP on anthropometric and metabolic biomarkers of obesity across the study population.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>TT</th>
<th>TG</th>
<th>GG</th>
<th>P* value</th>
<th>Dominant Model (GT+GG vs. TT)</th>
<th>P* value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI Kg/m²</td>
<td>26.76±4.02</td>
<td>29.01±5.67</td>
<td>30.51±4.58</td>
<td>0.02*</td>
<td>29.71±5.20</td>
<td>0.010**</td>
</tr>
<tr>
<td>HbA1C %</td>
<td>5.28±0.37</td>
<td>5.36±0.53</td>
<td>5.18±0.26</td>
<td>0.248</td>
<td>5.27±0.43</td>
<td>0.70</td>
</tr>
<tr>
<td>FG mg/dl</td>
<td>92.73±23.17</td>
<td>86.09±24.39</td>
<td>90.54±30.46</td>
<td>0.371</td>
<td>88.20±27.29</td>
<td>0.159</td>
</tr>
<tr>
<td>TC mg/dl</td>
<td>144.02±38.51</td>
<td>162.77±38.49</td>
<td>175.06±43.46</td>
<td>0.019*</td>
<td>168.60±41.03</td>
<td>0.010**</td>
</tr>
<tr>
<td>TG mg/dl</td>
<td>133.19±52.39</td>
<td>141.74±48.85</td>
<td>150.98±62.27</td>
<td>0.571</td>
<td>146.12±55.32</td>
<td>0.416</td>
</tr>
<tr>
<td>VLDL-C mg/dl</td>
<td>26.64±10.48</td>
<td>28.35±9.77</td>
<td>30.19±12.45</td>
<td>0.571</td>
<td>29.22±11.06</td>
<td>0.416</td>
</tr>
<tr>
<td>HDL-C mg/dl</td>
<td>50.58±14.06</td>
<td>51.95±15.32</td>
<td>50.78±11.51</td>
<td>0.925</td>
<td>51.399±13.54</td>
<td>0.817</td>
</tr>
<tr>
<td>LDL-C mg/dl</td>
<td>66.80±36.598</td>
<td>82.46±39.09</td>
<td>94.08±38.26</td>
<td>0.029*</td>
<td>87.98±38.81</td>
<td>0.017*</td>
</tr>
<tr>
<td>LEP ng/mL</td>
<td>23.76±10.24</td>
<td>26.25±8.47</td>
<td>27.45±7.62</td>
<td>0.335</td>
<td>26.81±8.04</td>
<td>0.165</td>
</tr>
<tr>
<td>LEPR ng/mL</td>
<td>36.75±12.72</td>
<td>34.65±13.06</td>
<td>39.78±13.69</td>
<td>0.292</td>
<td>37.04±13.49</td>
<td>0.782</td>
</tr>
<tr>
<td>LEP/LEPR</td>
<td>0.652±0.306</td>
<td>0.86±0.47</td>
<td>0.771±0.333</td>
<td>0.061</td>
<td>0.82±0.41</td>
<td>0.029*</td>
</tr>
<tr>
<td>Insulin μIU/mL</td>
<td>7.945±3.89</td>
<td>8.97±5.78</td>
<td>11.31±7.32</td>
<td>0.084</td>
<td>10.06±6.59</td>
<td>0.105</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>1.9139±1.39</td>
<td>1.99±1.47</td>
<td>2.52±1.89</td>
<td>0.323</td>
<td>2.24±1.69</td>
<td>0.420</td>
</tr>
</tbody>
</table>

Figure 1: Genotyping of *FTO* gene polymorphism (rs17817449) by Tetra-ARMS PCR on 2% agarose gel electrophoresis. Lanes M: DNA Marker, NC: Negative control. Lanes 1-3, 7, 9-11, 14, 16, 18 and 21: TT genotype. Lanes 4 and 19: GG genotype. Lanes 5, 6, 8, 12, 13, 15, 17, and 20: GT genotype.
Conclusion

In conclusion, the FTO gene polymorphism, rs17817449, was found to be associated with being overweight/obese for Iraqi pregnant women and the presence this variant is significantly associated with higher BMI, TC, LDL-C, and LEP/LEPR ratio. Moreover, the current study is the first to investigate and confirm the association of between rs17817449 polymorphism and LEP/LEPR in Iraqi female population.

Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: This study was self-funded

Ethical Clearance: The current study was approved by the Ethics Committee of Al-Eluia Teaching Hospital in Baghdad, Iraq and the Scientific Committee of Chemistry Department, Collage of Science at Al-Mustansiriyah University. All participants were informed about the study and verbal consent had been taken.

References


Structural and DFT/TD-DFT Investigation of New Rhenium Metal Complexes To Elicit the Special Effects of Insulin

Hussein Neama Najeeb¹, Mohammed Abdul Ammer AL-Shareefi¹, Hamid I. Abbood²
¹University of Babylon-College of Science, Babylon, Iraq, ²AL-Mustaqbal University College, Babylon, Iraq

Abstract

Density functional calculations have been performed to study the new metal complexes. Several molecular properties, such as conformational equilibrium, optimal geometry, and vibrational frequencies, have been computed for these molecules. Ionization energies, electronic affinity and energy gap, were also computed.

Keywords: DFT, Rhenium, Complexes.

Introduction

Inorganic chemistry has generated significant interest in the design of metal complexes as potential diagnostic and therapeutic agents. There are several metal complexes that are already in use for these purposes and this has encouraged further research on new metal drugs such as metal-mediated antibiotics and anticancer and antiviral compounds¹. The coordination chemistry of transition metal complexes with more than one type of ligands is of current interest because they serve as models for biochemical reactions². Also, they provide new materials with useful properties such as magnetic exchange³, electrical conductivity⁴, and nonlinear optical property⁵. Mixed ligand complexes play important roles in biological processes like activation of enzymes by metals⁶ and storage and transport of active substances through membranes⁷. The element rhenium (Re) is a refractory metal that has gained significant recognition as a high-performance engineering material because it exhibits an exclusive combination of properties. Rhenium coatings are used in thermo-photovoltaic (TPV) power generation systems, in which the radiator emits infrared photons from its surface to the TPV cells for conversion to electrical power. In this regard, CVD of Re whiskers was found to increase the emissivity of Mo, Nb and the Haynes 230 alloy.¹¹ Electrodeposited Re-selenium (Se) thin films are used as photosensitive elements in the visible range.¹² Electrodeposition of Re on silicon (Si) has been suggested for application in micro-systems.¹³ Electroplated Co-Ni-Re-W-P micro-arrays have been suggested for future application in magnetic micro-electro-mechanical-system (MEMS) devices.¹⁴

Methodology

Present work deals with the electronic structure of Rhenium metal complexes by employing the three parameters B3LYP (Becke’s three parameter exchange with Lee, Yang, and Parr correlation functional) (DFT) and SDD (Stuttgart Dresden triple zeta ECPs (Effective-Core Potential))basis sets¹⁵,¹⁶. The electronic properties were calculated according to Koopmans theorem. Excitation energies and vibration transitions are carried out by using the Time Dependent TD density functional theory.

Results and Discussion

The relax structures of the suggested Rhenium metal complexes are relax by employing the SDD-B3LYP/DFT method. The total energy ET of the studied Rhenium metal complexes and some of their electronic properties were calculated by using B3LYP-SDD/DFT and listed in Table 1. The electronic properties were calculated according to Koopmans theorem. As shown in mentioned Table, the ET depends on the number of electrons in the complex, ET was decreased with increasing the number of electrons in the complex. The values of virial ratio (\(V/T\)) for the studied complexes are in the range (2.0253-2.0236), these results gave an
idea for the suitable method used with SDD basis sets for the relaxation of the metal complexes. From table 1, all studied complexes have ionization energies IE are greater than the electron affinities EA. High value of IE means difficult tendency of complex to donating an electron. Complex A has the largest value of IE refers to that it needs high energy to donating an electron in comparison with the other complexes. On the other hand, complex C needs small energy to donating an electron compared with the other complexes. The results in Table 1 showed complex C has low value of EA in which it has low ability to accept an electron with large Egap. The calculated values of electronegativity EN showed the presence of methoxy group in active sites in the complex play role of increasing the EN of the complex. The order of EN of the studied Rhenium metal complexes is as: D˃B˃A˃C. The results in table 1 showed the complex A has the higher electrophilic index compared with the others. If determines the interactions of the complex with the surrounding species, then the ranking is as: A˃D˃B>C. Infrared IR spectra of Rhenium metal complexes from the B3LYP-SDD/DFT calculations. From the spectrum of complexes the stretching C-H bonds was observed in the range (3165.33-3241) cm⁻¹ with maximum intensity (100.9 km/mol) observed for C-H bending at (1504.71-1231) cm⁻¹, the bending C-N bonds was observed at (1619-1559) cm⁻¹. The stretching Re-Cl bonds was observed at (369-339 cm⁻¹). The stretching C-C bonds was observed at (1664.8-1619.5) cm⁻¹. The density of states DOS for Rhenium metal complexes analyzed from the calculations of B3LYP-SDD/DFT. DOS is significant to be able to expect the behave for different molecular structures geometries. In present group of Rhenium metal complexes,all the complexes A , B ,C and D have doublet state. As shown, complex A has lower distribution of energy in each energy interval due to the low degeneracy of the eigen states, but the degeneracy of occupied eigen states is more than the degeneracy of unoccupied eigen states. Also, in the other complexes the degeneracies of occupied eigen states are more than those of unoccupied eigen states. The small separation between the occupied and unoccupied molecular eigen states for complex B gave this complex to has a suitable application in electron transform. The behavior of excitation energies of the studied Rhenium metal complexes were studied due to the calculations of the B3LYP-SDD/TD-DFT. The UV-Vis spectra of the studied complexes. As seen, complex A appeared three peaks of excitation energy at (5498.1524, 2612.3754 and1564.8534) nm wavelength with transition between the frontier orbitals HOMO( β )→LUMO( β ) , H-1( α )→LUMO( α ) , HOMO( β )→L+1( β ) , H-1( α )→LUMO( α ) , HOMO( β )→L+1( β ) , H-1( α )→LUMO( α ) , HOMO( β )→L+1( β ) , H-1( α )→LUMO( α ) , HOMO( α )→LUMO( α ) , HOMO( β )→L+1( β ) and H-2( α )→LUMO( α ) low oscillation strength (0.0009, 0.0003 and0.0006 consequently). Three peaks of excitation energy were observed for complex B at 5755.9580 nm with four main electronic transitions H-1( β )→LUMO( β ) , HOMO( β )→LUMO( β ) , H-1(A)→LUMO(A) and H-1( β )→L+1( β ) due to oscillation strength (0.0008) and 2743.6011nm with seven main electronic transitions H-2( α )→LUMO( α ) , H-1( α )→LUMO( α ) , H-1( β )→L+1( β ) , HOMO( β )→L+1( β ) , H-3( α )→LUMO( α ) , HOMO( α )→LUMO( α ) , and H-1( β )→LUMO( β ) due to the oscillation strength (0.0002) and 1538.0639 nm with five main electronic transitions H-2( α )→LUMO( α ) , H-1( α )→LUMO( α ) , H-1( β )→L+1( β ) , HOMO( β )→L+1( β) , H-3( α )→LUMO( α ) , HOMO( α )→LUMO( α ) , and H-1( β )→LUMO( α ) due to the oscillation strength0.0004. Complex C appeared one peak of excitation energy at 1858.5419nm due to oscillation strength (0.025) with electronic transitions H-2( α )→LUMO( α ) , H-1( α )→LUMO( α ) , H-1( β )→L+1( β ) , HOMO( β )→L+1( β) , H-3( α )→LUMO( α ) , HOMO( α )→LUMO( α ) , and H-1( β )→LUMO( α ) due to the oscillation strength0.0004. Complex C appeared one peak of excitation energy at 1858.5419nm due to oscillation strength (0.025) with electronic transitions H-2( α )→LUMO( α ) , HOMO( α )→LUMO( α ) and HOMO( β )→L+1( β ). Two peaks of excitation energy were observed for complex D at 7482.3981nm with two main electronic transitions HOMO( β )→LUMO( β ) and H-2( β )→LUMO( β ) due to oscillation strength (0.0004) and 1659.5279nm with four main electronic transitions H-1( α )→LUMO( α ) , HOMO( α )→LUMO( α ) , HOMO( β )→L+1( β ) and H-2( α )→LUMO( α ) due to the oscillation strength (0.0017).
Table 1: ET and some electronic properties of Rhenium metal complexes.

<table>
<thead>
<tr>
<th>Rhenium metal complexes</th>
<th>$E_T$ (a.u)</th>
<th>$I_E$ (eV)</th>
<th>$E_A$ (eV)</th>
<th>$E_N$ (eV)</th>
<th>(eV)</th>
<th>$\mu$ (eV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-2570.53</td>
<td>2.0253</td>
<td>5.9198</td>
<td>3.7192</td>
<td>4.8195</td>
<td>10.5552</td>
</tr>
<tr>
<td>B</td>
<td>-2740.38</td>
<td>2.0241</td>
<td>5.6104</td>
<td>3.5151</td>
<td>5.5627</td>
<td>9.9361</td>
</tr>
<tr>
<td>C</td>
<td>-2681.23</td>
<td>2.0245</td>
<td>5.5230</td>
<td>3.4158</td>
<td>4.4694</td>
<td>9.4796</td>
</tr>
<tr>
<td>D</td>
<td>-2799.54</td>
<td>2.0236</td>
<td>5.8164</td>
<td>3.6433</td>
<td>5.7298</td>
<td>10.2947</td>
</tr>
</tbody>
</table>

**Conclusion**

Rhenium metal complexes have varying electronic applications due to different values of energy gap. Rhenium metal complexes have low electrophilic index in which refers to these complexes used as catalysts in chemical reactions such as polymerization processes. Approximately all studied aluminum metal complexes have low values of hardness and softness, they are all weak in electron transfer. They can be used as catalysts for chemical reactions. The results of UV-Vis spectra showed the Rhenium metal complexes have various applications such as electronic devises.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon-College of Science, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

9. Mildvan AS , M Cohn. Kinetic and magnetic


Effectiveness of Structured Teaching Program upon Midwives’ Knowledge Concerning Use of Partograph during First Stage of Labor in Al-Hilla Hospitals

Fawziya M. Nattah¹, Amean A. AL-Yasir¹, Muna A.Khaleel¹

¹Community Health Nursing Department, College of Nursing, University of Babylon, Hilla City, Iraq

Abstract

Teaching program prepare nurse midwife to teach laboring women for labor by providing information and practicing that promote women’s self-control and may contribute for a satisfactory birthing experience. Therefore, the aim of this study is to improve the knowledge of nurse midwives in a scientific and applicable way by implementing the teaching program that focus on knowledge upon the use of partograph during labor. A quasi-experimental design was carried out throughout the present study during September 26th 2017 to December 20th 2018. A Non-probability (purposive) sample were selected consisted of (50) nurse midwives who worked in delivery rooms in Babylon Teaching Hospitals for Maternity and pediatric who attended the teaching program as the study group and the other group of (25) midwives who were employed in AL- Hilla General Teaching Hospital who did not attend the teaching program and considered as a control group. Data were analyzed through using the descriptive and inferential analysis. The study results revealed that no statistically significant differences in the proportions of participants in both groups who did have previous knowledge about the use of partograph in all comparisons, (P>0.05).

Keywords: Effectiveness, teaching program, Midwives’, knowledge, partograph, first stage.

Introduction

The teaching program prepares nurse midwife to teach laboring women for labor by providing information and practicing. Nursing intervention promotes women’s self-control and may contribute for a satisfactory birthing experience ¹. Promoting the health of women in labor is considered to be one active way of reducing maternal morbidity and mortality as well as ensuring universal access to reproductive health services ². Midwives are responsible to provide care and support for delivery for mothers in non-complicated deliveries. Midwife’s functions and actions during this critical stage of a woman’s life may lead to different outcomes ranging from life to death and from heath to physical injuries, with significant effects on the mental and emotional health of mother and child ³. A partograph is one of the valued suitable technologies in use for an improved monitoring of labor progress for maternal and fetal wellbeing ⁴. Nurse midwives play a vital role during labor and delivery by providing necessary nursing interventions for laboring women. Nurse midwife should be a good educator, available encouraging, professional and supportive during labor and delivery ⁵. Nurse midwives are trained to assist during labor and birth, either through direct-entry or nurse-midwifery teaching programs. Assessment of learners by pre- and post-tests provide a useful means of establishing a baseline for learners’ theoretical knowledge. The same questions used in the pre-test should be used again in the post-test to assess knowledge on completion of the module ⁶.

Materials and Method

Design of the study: A quasi-experimental design was carried out throughout the present study during February 14th 2018 to June 10th 2018 with the application of test-retest approach of pre-test for the study and control groups. A Non-probability (purposive) sample were selected consisted of (50) nurse midwives who
worked in delivery rooms of the two hospitals. The subjects were divided into (2) groups; study and control. One group consists of (25) midwives who are working in the delivery room in Babylon Teaching Hospitals for Maternity and pediatric who attended the teaching program as the study group and the other group of (25) midwives who were employed in Al- Hilla General Teaching Hospital who did not attend the teaching program and considered as a control group.

**Study instrument** The structured knowledge questionnaire for 10 items related to midwives’ knowledge concerning use of partograph during first stage of labor was used to collect the data. The rating and scoring system of the scale is consisted of each correct answer was awarded with a score of ’1’ and score of ‘0’ was awarded for the wrong answer. Questionnaire consisted of 10 multiple choice questions to assess their knowledge.

**Data Analysis** Data were entered managed and analyzed using the statistical package for social sciences (SPSS) software for windows version 25. Descriptive statistics expressed as frequencies and percentages for nominal and ordinal variables, means and standard deviation for continues variables and using Chi-square test, t test and ANOVA.

### Results and Discussion

As it shown in (Table 1) Only 7 (28%) participants in the study group and 9 (36%) controls had a previous knowledge about the use of partograph during labor and finally, no statistically significant differences in the proportions of participants in both groups who did have previous knowledge, in all comparisons, (P>0.05). Furthermore, regarding the sources of these knowledge, seminars were the main sources of knowledge in both studied groups, followed by training and workshops courses in lower frequencies with no significant differences between both groups regarding their sources of knowledge, (P>0.05). Regarding the correct responses about the 10 items of knowledge about the use of partograph during labor domain, the lower proportion of participants in the study group and controls, (24%) and (28%), respectively, had the correct knowledge that when admission to the hospital takes place in the active phase, the dilatation is immediately plotted on alert line. The higher proportion of correct responses reported about the question When does the active phase commence?, 48% of study group and 52% of controls. Responses towards other items ranged between the aforementioned lower and higher proportions. However, no statistically significant differences had been found between both groups regarding the correct responses towards the items of knowledge about the use of partograph domain for all items (P>0.05) (Table 2). The Iraqi Ministry of Health stressed the need to follow or use the partograph in the delivery rooms and established many workshops on this subject, but this aspect is limited in using because the physicians are authored only to fill out the form items of the partograph without allowing nurse midwives to fill or use this chart. It revealed that the knowledge and inclination to use this instrument should be reinforced through periodic regular professional education by way of unit presentations, seminars, and workshops. The higher correct answers (100 %) were reported for question 3” When does the active phase commence? and question 6 stated that: When the fetal heart rate is below 100, it indicates? And question 9 in study group as shown (Table 3). Highly significant differences between both studied groups had been reported in the proportions of correct responses towards the items of knowledge about the use of partograph during labor (Table 3). The study result was similar to a survey study conducted by (8) to assess the knowledge of the labor partograph among the birth attendants at Cameroon. The result of the study revealed that the highest percentage (65%) of the midwives had poor knowledge regarding partograph. (Table 4). The lower correct answer (24%) was recorded for question 10 concerning “ When admission to the hospital takes place in the active phase, the dilatation is immediately plotted on:” in the control group, whereas in study group the lower correct answer (88%) was recorded for the same question. The crossing of the alert line is associated with fetal distress which increase need for resuscitation of the baby. (Table 5) demonstrate the comparison and changes in the mean scores of knowledge about the partograph during labor domain, where the mean score of knowledge for this domain at pre-test was 3.96 ± 1.99 in the study group and significantly elevated to 9.56 ± 0.77 at post-test 1, (P<0.001) , then relatively and not significantly reduced to 9.28 ± 0.84 at post-test 2, (P>0.05). In control group the baseline mean score for this domain was 3.84 ± 2.95 and did not significantly changed at post-test 1 and 2, (P>0.05). The mean score of knowledge was insignificantly different between study group and controls at pre-test, while highly significant difference was reported at post-test
1 and 2. The effect size was large at post-test 1, (3.88) and still large (3.62) at post-test 2. Further comparison of the mean differences in the mean knowledge score (post-test1- pre-test), (post-test2- pre-test) revealed that the mean differences were significantly larger in study group than control group, (P<0.001). The difference between post-test 1 and 2 was insignificantly different between both studied groups, (P>0.05). Changes in knowledge scores regarding the knowledge about the use of partograph during labor before and after teaching program of studied groups. Changes in knowledge levels about the use of partograph during labor domain before and after teaching program of studied groups, (Table 6).

Table 1. Previous knowledge of participants in study group and controls regarding use of partograph during first stage of labor

<table>
<thead>
<tr>
<th>Variables</th>
<th>Study group (N= 25)</th>
<th>Control group (N = 25)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Have previous knowledge about the use of partograph during labor</td>
<td>7 28.0</td>
<td>9 36.0</td>
<td>0.56</td>
</tr>
<tr>
<td>Source of information</td>
<td>Seminar</td>
<td>4 57.1</td>
<td>5 55.6</td>
</tr>
<tr>
<td></td>
<td>Workshop</td>
<td>1 14.3</td>
<td>2 22.2</td>
</tr>
<tr>
<td></td>
<td>Training course</td>
<td>2 28.6</td>
<td>2 22.2</td>
</tr>
</tbody>
</table>

Table 2. Frequency distribution and comparison of correct responses of study group and controls before teaching program (pretest) regarding items of knowledge about the use of partograph during labor domain

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group (N = 25)</th>
<th>Control group (N = 25)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 Partograph means</td>
<td>10 40.0</td>
<td>9 36.0</td>
<td>0.77</td>
</tr>
<tr>
<td>Q2 What is the purpose of partograph?</td>
<td>10 40.0</td>
<td>9 36.0</td>
<td>0.77</td>
</tr>
<tr>
<td>Q3 When does the active phase commence?</td>
<td>12 48.0</td>
<td>13 52.0</td>
<td>0.78</td>
</tr>
<tr>
<td>Q4 What are the components of partograph?</td>
<td>11 44.0</td>
<td>10 40.0</td>
<td>0.77</td>
</tr>
<tr>
<td>Q5 In which phase the cervical dilatation will be slow?</td>
<td>9 36.0</td>
<td>7 28.0</td>
<td>0.54</td>
</tr>
<tr>
<td>Q6 When fetal heart rate is below 100, it indicates?</td>
<td>11 44.0</td>
<td>13 52.0</td>
<td>0.57</td>
</tr>
<tr>
<td>Q7 Which of the following colors indicate that the liquor amnion color is normal?</td>
<td>10 40.0</td>
<td>8 32.0</td>
<td>0.55</td>
</tr>
<tr>
<td>Q8 Which letter is used to record on partograph when the membranes are intact</td>
<td>9 36.0</td>
<td>11 44.0</td>
<td>0.54</td>
</tr>
<tr>
<td>Q9 Which letter is used to record on partograph when the amniotic fluid is meconium stained?</td>
<td>11 44.0</td>
<td>9 36.0</td>
<td>0.56</td>
</tr>
<tr>
<td>Q10 When admission to the hospital takes place in the active phase, the dilatation is immediately plotted on alert line</td>
<td>6 24.0</td>
<td>7 28.0</td>
<td>0.75</td>
</tr>
</tbody>
</table>
Table 3. Frequency distribution and comparison of correct responses of study group and controls after teaching program (Post-test 1) regarding items of knowledge about the use of partograph during labor domain

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group $(N = 25)$</th>
<th>Control group $(N = 25)$</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Q1 Partograph means</td>
<td>24</td>
<td>96.0</td>
<td>10</td>
</tr>
<tr>
<td>Q2 What is the purpose of partograph?</td>
<td>24</td>
<td>96.0</td>
<td>11</td>
</tr>
<tr>
<td>Q3 When does the active phase commence?</td>
<td>25</td>
<td>100.0</td>
<td>14</td>
</tr>
<tr>
<td>Q4 What are the components of partograph?</td>
<td>24</td>
<td>96.0</td>
<td>12</td>
</tr>
<tr>
<td>Q5 In which phase the cervical dilatation will be slow?</td>
<td>20</td>
<td>80.0</td>
<td>8</td>
</tr>
<tr>
<td>Q6 When fetal heart rate is below 1, it indicates?</td>
<td>25</td>
<td>100.0</td>
<td>12</td>
</tr>
<tr>
<td>Q7 Which of the following colors indicate that the liquor amnion color is normal?</td>
<td>23</td>
<td>92.0</td>
<td>10</td>
</tr>
<tr>
<td>Q8 Which letter is used to record on partograph when the membranes are intact</td>
<td>23</td>
<td>92.0</td>
<td>11</td>
</tr>
<tr>
<td>Q9 Which letter is used to record on partograph when the amniotic fluid is meconium stained?</td>
<td>25</td>
<td>100.0</td>
<td>8</td>
</tr>
<tr>
<td>Q10 When admission to the hospital takes place in the active phase, the dilatation is immediately plotted on:</td>
<td>19</td>
<td>76.0</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4. Frequency distribution and comparison of correct responses of study group and controls after teaching program (Post-test 2) regarding items of knowledge about the use of partograph during labor domain

<table>
<thead>
<tr>
<th>Items</th>
<th>Study group $(n = 25)$</th>
<th>Control group $(n = 25)$</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Q1 Partograph means</td>
<td>24</td>
<td>96.0</td>
<td>8</td>
</tr>
<tr>
<td>Q2 What is the purpose of partograph?</td>
<td>24</td>
<td>96.0</td>
<td>10</td>
</tr>
<tr>
<td>Q3 When does the active phase commence?</td>
<td>25</td>
<td>100.0</td>
<td>13</td>
</tr>
<tr>
<td>Q4 What are the components of partograph?</td>
<td>25</td>
<td>100.0</td>
<td>11</td>
</tr>
<tr>
<td>Q5 In which phase the cervical dilatation will be slow?</td>
<td>24</td>
<td>96.0</td>
<td>7</td>
</tr>
<tr>
<td>Q6 When fetal heart rate is below 1, it indicates?</td>
<td>25</td>
<td>100.0</td>
<td>11</td>
</tr>
</tbody>
</table>
**Table 4. Frequency distribution and comparison of correct responses of study group and controls after teaching program (Post-test 2) regarding items of knowledge about the use of partograph during labor domain**

<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Study group (N = 25)</th>
<th>Control group (N = 25)</th>
<th>Effect size</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q7</td>
<td>Which of the following colors indicate that the liquor amnion color is normal?</td>
<td>22</td>
<td>88.0</td>
<td>10</td>
<td>40.0</td>
</tr>
<tr>
<td>Q8</td>
<td>Which letter is used to record on partograph when the membranes are intact</td>
<td>24</td>
<td>96.0</td>
<td>10</td>
<td>40.0</td>
</tr>
<tr>
<td>Q9</td>
<td>Which letter is used to record on partograph when the amniotic fluid is meconium stained?</td>
<td>24</td>
<td>96.0</td>
<td>10</td>
<td>40.0</td>
</tr>
<tr>
<td>Q10</td>
<td>When admission to the hospital takes place in the active phase, the dilatation is immediately plotted on:</td>
<td>22</td>
<td>88.0</td>
<td>6</td>
<td>24.0</td>
</tr>
</tbody>
</table>

**Table 5. Comparison of changes in mean score of knowledge about the use of partograph during labor domain before and after teaching program**

<table>
<thead>
<tr>
<th>knowledge about the use of partograph domain</th>
<th>Study group (N = 25)</th>
<th>Control group (N = 25)</th>
<th>Effect size</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Pre test</td>
<td>3.96</td>
<td>1.99</td>
<td>3.84</td>
<td>2.95</td>
</tr>
<tr>
<td>Post-test 1</td>
<td>9.56</td>
<td>0.77</td>
<td>4.04</td>
<td>1.86</td>
</tr>
<tr>
<td>Post-test 2</td>
<td>9.28</td>
<td>0.84</td>
<td>4.36</td>
<td>1.95</td>
</tr>
<tr>
<td>Mean difference Post1 - Pre</td>
<td>5.60</td>
<td>2.25</td>
<td>0.20</td>
<td>3.57</td>
</tr>
<tr>
<td>Mean difference Post 2 – Pre</td>
<td>5.32</td>
<td>2.29</td>
<td>0.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Mean difference Post 2 - Post 1</td>
<td>0.28</td>
<td>1.06</td>
<td>-0.20</td>
<td>2.16</td>
</tr>
</tbody>
</table>

Pairwise comparisons (P. values)

<table>
<thead>
<tr>
<th>Comparison</th>
<th>P. value</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Post 1 vs. Pre</td>
<td>&lt;0.001</td>
<td>0.78</td>
</tr>
<tr>
<td>Post 2 vs. Pre</td>
<td>&lt;0.001</td>
<td>1.00</td>
</tr>
<tr>
<td>Post 1 vs. Post 2</td>
<td>0.20</td>
<td>0.65</td>
</tr>
</tbody>
</table>
Table 6. Comparison of level of knowledge about the use of partograph during labor before and after teaching program

<table>
<thead>
<tr>
<th>Levels of knowledge about use of partograph domain during labor</th>
<th>Study group (N = 25)</th>
<th>Control group (N= 25)</th>
<th>P. value between groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Pre test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>23</td>
<td>92.0</td>
<td>22</td>
</tr>
<tr>
<td>Fair</td>
<td>2</td>
<td>8.0</td>
<td>3</td>
</tr>
<tr>
<td>Good</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Posttest 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0.0</td>
<td>20</td>
</tr>
<tr>
<td>Fair</td>
<td>1</td>
<td>4.0</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>24</td>
<td>96.0</td>
<td>1</td>
</tr>
<tr>
<td>Posttest 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0.0</td>
<td>22</td>
</tr>
<tr>
<td>Fair</td>
<td>1</td>
<td>4.0</td>
<td>1</td>
</tr>
<tr>
<td>Good</td>
<td>24</td>
<td>96.0</td>
<td>2</td>
</tr>
</tbody>
</table>

P. value Within groups

| Pre vs. Post1 | < 0.001 | 0.54 |
| Pre vs. Post 2 | < 0.001 | 0.22 |
| Post1 vs. Post2 | 1.00 | 0.33 |

**Conclusion**

Improvement in the knowledge of the study group of nurse midwives was clarified after teaching program (post-test) regarding use of partograph during labor domains.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Community Health Nursing Department, College of Nursing, University of Babylon, Hilla City, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**


7. Yohannan T, Koshy S. A study to Assess the Effectiveness of structured Teaching programme on


15. Yasir AA. Determination the type and factors of domestic violence against woman in the Hilla population. Research journal of pharmacy and technology. 2017; 10(10)


18. Yasir AA. Used of growth charts among children age 1-5 years old and its effects on child health in al Hilla city. Journal of global pharma technology. 2017; 9(10)
The Effect of the Pyramid Strategy of Preference on the Achievement of Students in Science in the Development of Human Life in the Field of Health and Energy

Alaa Mohammed Tuhah¹, Saeed Hussein Ali Thalab¹, Mohammed Hadi Shnein¹
¹University of Babylon – college of Basic Education, Department of post-Graduate Studies, Teaching Methods of Science, Iraq

Abstract

The research’s aim is to identify the effect of the strategy of the pyramid of preference in the achievement of students at the second grade in science. To achieve the goal of the research, the researcher put the zero hypothesis which states: There is no significant difference at the level of significance (0.05) between the average grades of students of the experimental group, The strategy of the pyramid of preference and the average grades of the students of the control group who will study according to the usual method in the test of the collection of the science prepared for this purpose, and applied his experience in the second half of the academic year (2018-2019). The sample consisted of (70) intermediate school (35) students. The total number of students in the control group reached (35) students. The two groups were rewarded in the following variables (age, IQ tests, grade of science in the first grade average). In the light of the relative importance of the content and the behavioral purposes, daily teaching plans were prepared (32) for each group (16) plan and also for the construction of an achievement test consisting of (40) multiple choice types.

Key words: Effect of strategy of the pyramid of preference, achievement, second grade students, science.

Introduction

The Physics subject is one of the important science curricula and plays a major role in the change and scientific development. It has brought with it the attention of educationalists, including the hand of innovation, development and modernization in terms of content, methods of teaching and teaching aids. Physics is one of the important branches of science. The development of modern technology. If a nation wants to become rich, it must acquire a high degree of experience in physics, and physics is important in the development of scientific thinking, as its study helps us to understand more deeply. Physics, which contribute to the development of mental skills and different thinking skills. The physics of the subject matter requires skills, requires thinking, and employs the learners’ mental abilities and uses them for questions and activities. Thus, To understand the meaning of scientific terms that help him to understand and interpret phenomena, and help him to understand the relationships between the elements of the phenomenon to access the laws, and recognizes the importance of physics in the development of human life in the field of health and energy And help him in the analysis of physical phenomena to form a comprehensive view of the development of the correct results, and help him to show the impact of physics in the rest of the other science subjects such as biology and chemistry. At the global level, Science, and called to focus on the use of modern methods and strategies in the study of science. The teacher’s choice of effective teaching method is an important reason for the success of teaching and success of the educational process because of the multiplicity of teaching methods and strategies, and there is no preferred method to the other. The teacher should be familiar with the teaching methods and the modern strategies so that he is able to choose the best methods or strategies that fit and fit the material he studies to reach the maximum
goals, teachers sought to find the best methods and strategies that are more useful in teaching science in general. It has been found that one of the methods that may contribute to a broader understanding of science and achieve many of the objectives of teaching in the middle stage is the use of active learning strategies and It is a strategy of the pyramid of preference, because it is a modern strategy that may help overcome the problems that hinder the students' understanding of science and raise their level of achievement. Moreover, this strategy has not been put into the experiment in teaching science for intermediate stage. If there is a difference between the students of the experimental group, which will study according to the pyramid strategy of preference, and among the students of the control group, which will study according to the usual method.

**Physics in Medicine**

International Organization of Medical Physics (IOMP), founded in 1963, is a scientific, educational and specialized institution with membership of 75 countries and more than 16,000 members. American College of Medical Physics (ACMP) published a scientific journal (Journal of Applied Clinical Medical Physics) jointly with the International Organization of Medical Physics. The American Board of Radiology - ABR aims to serve the citizens and medical professions by certifying that the certificate holders have obtained and maintained the required level of skill and science for the practice of radiotherapy, radiotherapy and radiation physics, The fields of Therapeutic Radiological Physics, Diagnostic Physics, and Nuclear Physics. The American Board of Medical Physics (ABMP) was founded in 1987 and is accredited by the Medical Board of Radiologists. Since 2001, the Council has stopped the accreditation of medical physicists in the fields of therapeutic Radiological Physics, Nuclear Physics, and Diagnostic Physics, where it has moved to the American Board of Radiation Medicine (ABR). The accreditation is now restricted to the MRI specialist Magnetic Resonance Imaging Physics and Health Physics Medical Health Physics. UK: Institute of Physics and Engineering in Medicine – IPEM: A charitable organization founded for the advancement of the community - with the applications of physics and engineering in medicine and biology, to push the wheel of education in this field and to represent the needs and interests of engineering and physical sciences in improving health care. Europe: European Federation of Organisms in Medical Physics - EFOMP was established in 1980 and covers national organizations representing more than 5000 physicists and engineers in the field of medical physics. Its objectives include: Encourage and coordinate the activities of national organizations and their interaction with international organizations, promote the exchange of professional and scientific information, exchange of medical physicists between countries, propose guidelines for education and training and the adoption of programs in medical physics and make recommendations in general responsibilities, organizational relations and the role of medical physicists, And to encourage the formation of medical physics organizations in places where such organizations do not exist. [11]

**Methodology**

It includes a presentation of the procedures necessary to achieve the research objective, starting with the research methodology and experimental design, defining the research community and its design, the equivalence of the research groups (experimental and control), preparation of the research requirements and tools.

**Experimental design of the research:**

The independent variable includes the strategy of the pyramid of preference, the normal method, and the dependent variable. Therefore, the researcher used the experimental design of the two groups of homogeneous and equal, one experimental and the other control.

**The research community and its model:**

The research community represents all the second grade students in the secondary and intermediate schools in the Diyala governorate for the academic year (2018-2019), where the average second grade population is not less than two divisions, As for the research, the researcher (Middle Iraq) in the center of Diyala province chose randomly to conduct his research. It was found that it comprises four divisions for the second intermediate grade (A, B, C and D) To represent the experimental group and the number of students (35) students who will study their students according to (Astra (C) to represent the control group and the number of its students (35) students who will study their students according to (the normal method). The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the
experiment.

**Control of Exotic Variables**

Although the researcher investigated the equivalence of the two sets of research in some variables that are believed to affect the course of the experiment, he tried to avoid the effect of some of the extraneous variables in the course of the experiment. Some of these variables and how to adjust them are as follows: Accidents Accompanying the Experiment: The experimental experience was not subjected to any emergency or accident that impeded its progress. Experimental extinction: There was no interruption or transfer of any student throughout the experiment. Sample selection: The two groups were randomly selected and the two groups were confirmed. The experiment is unified between the two groups. The effect of the experimental procedures: The researcher worked to limit the effect of experimental procedures that could affect the dependent variable during the course of the process. Experience. Preparation of research requirements: The research requirements are fundamental to the research on which the research procedures are carried out. These requirements are as follows: (The scientific material (content): The scientific material that the researcher is teaching was determined for the students of the two research groups during the period of the experiment (2018 - 2019). The researcher prepared (16) a plan for the experimental group which is taught according to the strategy of the pyramid of preference and the same for the control group which is taught according to the normal method.

**The research’s tool**

The “Collective Test” has been prepared according to the following steps: Determining the purpose of the achievement test The objective of the achievement test is to measure the achievement of the first grade students (information, skills and experience) in science in the study of physics related to the units (first, second and third), teaching the following subjects (movement, traffic laws, Power and energy, work and machinery, waveform and sound, light).

**Determination of behavioral goals:** After the purpose of the test was determined the achievement of behavioral goals to determine the extent of achievement and the researcher formulated a number of behavioral goals. The test subjects were formulated in the initial form in light of the test map. The researcher chose the type of test (multiple choice) which is one of the best objective tests. The test consisted of (40) test paragraphs distributed at levels of cognitive knowledge, Understanding, application, analysis). Test instructions: Specific instructions and instructions are written on how to answer (choosing only one correct alternative, answering all paragraphs, answer time, typing the triple name, row and division in the assigned space).

**Correcting the test answers:** A standard was set for correcting the answers by placing one score for each correct test paragraph and zero for the wrong answer, the left paragraph that the student did not answer and the paragraph for which more than one choice was made. Thus, (40) degrees) and the lowest score (zero). The validity of the test showed that the veracity and authenticity of the content were tested for the test. The results showed that the virtual honesty obtained the percentage of agreement (80%) of the opinions of the arbitrators and specialists. As for the validity of the content, the results showed that all the clauses of the test are statistically significant. In measuring the understanding and understanding of students in the second grade intermediate in science.

**The pilot application for the test of achievement:** including the following:

The first test was carried out on a group of second-grade students from a non-research sample. The number of students was 30 students. The purpose of this test was to know the clarity of the test instructions and guidelines, the understanding of the students’ For the test, the researcher recorded the exit time for each student. In calculating the arithmetic mean of time, it was found that the time needed to answer all the test paragraphs was (41) minutes.

**The second test application:** The test was applied to a sample of (100) students in the second intermediate grade without a research sample. The purpose of the test is to analyze the statistical achievement test paragraphs, namely paragraph difficulty, paragraph discrimination, effectiveness of the wrong alternatives. The statistical analysis of the test scores: The test scores were analyzed as follows: The difficulty of the paragraph: The statistical analysis of the test test subjects found that the coefficient of difficulty of the paragraphs ranged from (0.20 - 0.80) and thus all the test scores are acceptable and their difficulty is appropriate. The distinction of the
paragraph: An important feature that must be provided in the test paragraphs is the distinguishing feature. It means that the items or paragraphs can detect the individual differences of the students. The test items are valid. The coefficient of distinguishing the items is 30.0 and above. (0.37 - 0.74). Thus, the test scores are considered to have a good and appropriate discrimination coefficient.

The effectiveness of the wrong alternatives: The researcher conducted a statistical analysis (highest 27% and lowest 27%) degree to find the effectiveness of the wrong alternatives ranging between (0,03) and (-0.44) and it turned out that the alternatives to test paragraphs are all effective and thus prepare All of them are suitable.

Test stability: The stability of the test depends on the relationship between the test paragraphs, and this is shown by the stability of the degree and organization of the paragraphs, so the stability coefficient is the statistical indicator on the accuracy of the measurement and then the stability factor was calculated using the equation (Kyodrichadson-20) because it is a measure of the internal consistency of the test, The correlation coefficient (92%) indicates that the test has a high degree of stability. Application of the research tool: A week prior to the test, the students of the two research groups were notified after completing the course, and the researcher conducted the test at the same time within the pre-defined material.

The statistical methods

The researcher used the statistical means, including the test (t.test) for the independent samples to make the parity between the experimental group and the control group and analysis of the results, and Pearson correlation coefficient.

Results and Discussion

The students of the experimental group were superior to the students in the control group. Therefore, there is a statistically significant difference at the level of (0.05) between the averages of the students of the experimental group who studied the science according to the pyramid strategy of preference. Who studied the same material according to the “normal method” of collection and for the benefit of the experimental group?

Table 1. The results show that the experimental group is superior to the control group.

<table>
<thead>
<tr>
<th></th>
<th>No.</th>
<th>Average Arithmetic</th>
<th>standard deviation</th>
<th>Freedom degree</th>
<th>T value</th>
<th>Statistical significance level (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experm.</td>
<td>35</td>
<td>4.74</td>
<td>7.05</td>
<td>68</td>
<td>4.142</td>
<td>Indication</td>
</tr>
<tr>
<td>Control</td>
<td>35</td>
<td>40.6</td>
<td>6.66</td>
<td></td>
<td>2.000</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions

Through the results of the research was reached some of the most important conclusions: Teaching the pyramid strategy of preference gave students the opportunity to build and develop their knowledge and organize and arrange ideas sequentially as the previous information mainly to build new experiences, enabling students to be able to master the activities well. Teaching the second grade students according to the strategy of the pyramid of preference has had a positive impact in raising the level of their academic achievement.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon – college of Basic Education, Department of post-Graduate Studies, Teaching Methods of Science, Iraq and all experiments were carried out in accordance with approved guidelines.

References

2. Abu-Jalal SH. Teaching Science Experiences in the Light of Contemporary Teaching Strategies, 1,
Al Falah Library for Publishing and Distribution, Kuwait. 2007.


5. Gebran W. Active Learning - the classroom as a real learning center, Media and Educational Coordination Center, Al-Bireh Ramallah. 2002.

6. Abdel SM. Teaching Science and the Requirements of the Age, (I 1), Dar Al-Fikr Al-Arabi, Cairo, Egypt. 2006.


The Impact of Reading Comprehension Skills to Develop the Habits of Mind for Students

Khalid Sabah Dawood 1, Mashrq Muhammad Mjual 2, Rasim Ahmed Abees 2

1Master Student in College of Basic Education/ University of Babylon, Iraq,
2College of Basic Education/ University of Babylon, Iraq

Abstract

This research aims at identify the reading comprehension skills needed for Arabic curriculums according to teacher’s point of view, to achieve this aim, the literature and previous studies related to the study were reviewed, based on that, a questionnaire was designed that included a preliminary list of the necessary reading comprehension skills for Arabic language curriculums, in order to ascertain its validity apparent, it ruled by (23) specialists, according to the pinions of specialists and the suggestions, the researcher reach to a list of reading comprehension skills consists (20) skills, that distributed at three levels, the list of reading comprehension skills and levels was transformed into a final questionnaire, for the purpose of determining the relative importance of each skill in the whole list from the point of view of a short sample of Arabic language teachers, the sample number was (70) Teachers, and then sort the skills of the acceptable relative importance, that should be available in Arabic books, after the adoption of their opinions by adopting a percentage (75%)

Keywords: The Reading Comprehension Skills, Arabic Books, Arabic language teachers.

Introduction

The development of the educational curriculum is one of the requirements of modern-day educational systems because of the dramatic changes in the different life magazines that result in constant changes in the personal needs of learners, social needs and many problems facing persons and communities, which require a review and develop the educational curriculum in a way that makes it able to meet the requirements of the era. The Arabic language has a prominent place among the subjects at all levels of education, because it is the instrument of thought, and a means of communication and understanding, and the transfer of heritage from one generation to another; so it has received a great care and attention in the present era, even in the early ages of Arab-Islamic civilization. the aim of teaching Arabic at all grades of education is to provide students with the four basic language skills (listening, speaking, reading, writing) and helping them to acquire them, in a logical progression through the educational stages, to reach a level of linguistic excellence that enables them to exercise their thinking and expression in working life successfully and in scientific life in all future stages of education, and depends on the Arabic language success in the collection of other subjects. The reading is one of the most widespread and most significant of the Arab language, so it’s the first of all to be the language of the century, its development and the “mental and spiritual food that achieves a balanced and harmonious human being”, it became at the present time the activity of thought in the era of great knowledge revolution, it starts from the human sense of one problem, so he/she get reading in order to solve this problem, through that he/she tries to collect information needed to solve this problem in thinking, working and active, Since acquiring skills is the key to knowledge and the learning tool, it needs a aware study, , and a good view that takes the scientific curriculum as a style, So it’s not limited to the interpretation of written symbols, but the interaction between the reader and the readable text, the link between the language and the facts, the reader examines with his/
her experience and knowledge what is contained in the
text of the connotations and signs, symbols, semantics,
words, phrases, methods, deletion, interpretation,
commentary, analysis, criticism, linking, conclusion,
and generalization 6. A rational understanding is a
complex and basic mental process that helps students to
discovering or correcting the truth of the reading, whether
it is for pleasure or scientific achievement or for solving
a problem, and helps them to understand the visible and
subtle meanings, and to understand the various linguistic
relationships, so it is the basis of the educational process
and the interaction positive students with the community
in which they live, and the understanding is associated
with the person’s previous experience, and its interaction
with the new information included in the subject of
reading, the reader interprets and modifies and links past
experience with new information 7. The textbook is an
effective means of teaching, learning and presenting
the Arabic language to the learner, as it is the basic
framework that defines the minimum capacity, skills
and knowledge, and the factual image of the curriculum,
the first reference of the teacher and the learner, is
indispensable in any educational program. As a basic
guide to the content of educational programs, teaching
methods, and the process of evaluation 8. The problem
of research shows that there is a weakness in the content
of Arabic language books, as it does not develop the
skills of understanding students in the different stages of
the school, and despite the importance of understanding
and the corresponding importance of the attention both
in terms of the Ministry of Education and making it a
major aim of teaching Arabic language, or in terms of
the interest of researchers in developing skills, studies
and research in this field have confirmed the existence
of a weakness among students of different stages in the
skills of reading comprehension. Some Arabic studies
have indicated that Arabic textbooks often focus on the
skills of minimum reading comprehension levels, The
levels of primary targets, as well as their low balance
and comprehensiveness, and the lack of some of them,
such as 9 studies.

Methodology

The researcher tracked the results of previous
studies and researches in the field of the evaluation of
Arabic books, literature and books in the field of Arabic
language, the methods of teaching them in general, and
the skills of comprehension and levels in particular,
and the objectives of teaching the Arabic language for
the first middle grade, and from the previous sources
extracted A preliminary list of reading comprehension
skills and levels of ((36)) skills distributed at three
levels, offered to a group of specialized arbitrators, to
verify their sincerity, and to express their opinions on
the suitability of these skills for the students of the first
grade intermediate, The results of the arbitration after
modification, deletion and addition showed a list of
the reading skills and levels required for the first-grade
students, and the list included in its final form (20) a skill
spread over three levels, and a table 1. The researcher
converted the list of comprehension skills and levels in
final form to a questionnaire, and applied it to a sample
of the Arabic language teachers for the first middle grade
in the day schools affiliated to the General Directorate
of Education of the Province of Baghdad al-Karkh II, who
teach the language book Arabic for the first intermediate
grade actually for the academic year (2017-2018) by 70
teachers, and then extracted the relative weight of the
importance of each skill in each level of the reading
comprehension, and the following table (2) explains this:

From the previous table (2), it follows:

The skills (twenty) are arranged according to the
sequence of their relative importance.

... all teachers responded to each skill, thereby
enhancing confidence in the results and reflecting their
importance.

The (19) skill has a relative weight higher than
(75%), demonstrating its importance to respondents on
the one hand, and the importance of including it in the
Arabic language book content on the other.

The skill (8) of the first level: the level of literal
understanding, about the level of acceptance specified
in the search, and its text “encourages the giving of a
new title to the text read. “, since I got a relative weight
(7, 67%) Its failure to accept the level of acceptance,
and this does not reflect the poor importance of this skill
as one of the most important skills of literal reading
comprehension, as it does not indicate that respondents
ignore it, perhaps because of the frequent inclusion in
the content of the Arabic language book, as found by
the researcher in the Arabic language book, and maybe
some of them saw the lack of hajj The existence of such
a skill with the title of each text of my readers, and some
of them may understand that the reading text is intended
to be the whole study of the unit, without regard to the
paragraphs and their ideas.

The relative weights at the level of the three main levels were varied, with the first level: literal understanding of arithmetic mean (41, 2), relative weight (3, 80%), and second level: implicit understanding of arithmetic mean (39, 2) and relative weight (7, 79%), and finally got the third level: understanding The critic on arithmetic mean (36, 2) and relative weight (7 and 78%), this downward gradient logically corresponds to the importance of the skills of each level, as the first level represents the base of the hierarchical levels of understanding, which means that it should be of great importance in the content of the Arabic language book, as it applies to the majority of students Its importance ranked first, the pyramid is second level, and the number of students who reach it, its importance in the second place, and the third level at the top of the pyramid, and the distinguished students who will reach it, these results confirm the sincerity of the sample responses, frequency and persistence, as It could be interpreted according to the concept or the sincerity of the building, which underscores the importance of all skills.

Table 1. Skill spread over three levels

<table>
<thead>
<tr>
<th>Skills</th>
<th>Level</th>
<th>Reading comprehension skills</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>First: the level of literal (direct) Understanding:</td>
<td>Specifies the meaning of the word or its synonym by the text context.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Identifies the opposites of some of the words that appear in the text.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specifies the main idea in the text.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Specifies partial ideas in the text.</td>
</tr>
<tr>
<td></td>
<td>The order of the readable text shall be taken into account by chronological sequence.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Take into account the order of the readable texts by importance.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Defines the meaning of the common word.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encourages giving a new title to the readable text.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Second: the level of implicit (deductive/interpretative) Understanding:</td>
<td>Draws conclusions from the text.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Explains the meaning of the word contained in the text of the way of context.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shows the metaphorical meaning of the words and phrases contained in the text.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infer what the text contains, lessons and values.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Employs information from the text to infer in other cases.</td>
</tr>
<tr>
<td></td>
<td>Concludes the meanings that have not been declared in the readable text.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Third: The level of critical (corrective) Understanding:</td>
<td>Distinguish between the facts and the ideas contained in the text.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ruling on the text in the light of past experience or experience.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Evaluates the ideas contained in the text in terms of the contextual interrelationship of the script.</td>
</tr>
<tr>
<td></td>
<td>The authenticity of the read material and its suitability for the age shall be judged.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assesses what is relevant and what is not.</td>
</tr>
<tr>
<td></td>
<td>Supports controlled issues contained in the readable text.</td>
<td></td>
</tr>
</tbody>
</table>
Table (2). Illustrates the relative importance and weighted middle of the theoretical comprehension skills required in the Arabic language book content for the first intermediate grade from the point of view of the teachers.

<table>
<thead>
<tr>
<th>No.</th>
<th>Level</th>
<th>Skills</th>
<th>Weighted mean</th>
<th>Percentage weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Level 1: the level of literal (direct) Understanding</td>
<td>Specifies the meaning of the word or its synonym by the text context.</td>
<td>2.84</td>
<td>94.7</td>
</tr>
<tr>
<td>2</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>Identifies the opposites of some of the words that appear in the text.</td>
<td>2.69</td>
<td>89.7</td>
</tr>
<tr>
<td>3</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>Specifies the main idea in the text.</td>
<td>2.53</td>
<td>84.3</td>
</tr>
<tr>
<td>4</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>Specifies partial ideas in the text.</td>
<td>2.31</td>
<td>77</td>
</tr>
<tr>
<td>5</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>The order of the readable text shall be taken into account by chronological sequence.</td>
<td>2.29</td>
<td>76.3</td>
</tr>
<tr>
<td>6</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>Take into account the order of the readable texts by importance.</td>
<td>2.29</td>
<td>76.3</td>
</tr>
<tr>
<td>7</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>Defines the meaning of the common word.</td>
<td>2.26</td>
<td>75.3</td>
</tr>
<tr>
<td>8</td>
<td>Level 2: the level of literal (direct) Understanding</td>
<td>Encourages giving a new title to the readable text.</td>
<td>2.03</td>
<td>67.7</td>
</tr>
</tbody>
</table>

Arithmetic mean and the relative weight of the first level 2.41          80.3

<table>
<thead>
<tr>
<th>No.</th>
<th>Level 2: the level of implicit (deductive/interpretative) Understanding</th>
<th>Draws conclusions from the text.</th>
<th>2.59</th>
<th>86.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Level 2: the level of implicit (deductive/interpretative) Understanding</td>
<td>Explains the meaning of the word contained in the text of the way of context.</td>
<td>2.44</td>
<td>81.3</td>
</tr>
<tr>
<td>3</td>
<td>Level 2: the level of implicit (deductive/interpretative) Understanding</td>
<td>Shows the metaphorical meaning of the words and phrases contained in the text.</td>
<td>2.41</td>
<td>80.3</td>
</tr>
<tr>
<td>4</td>
<td>Level 2: the level of implicit (deductive/interpretative) Understanding</td>
<td>Infer what the text contains, lessons and values.</td>
<td>2.31</td>
<td>77</td>
</tr>
<tr>
<td>5</td>
<td>Level 2: the level of implicit (deductive/interpretative) Understanding</td>
<td>Employs information from the text to infer in other cases.</td>
<td>2.31</td>
<td>77</td>
</tr>
<tr>
<td>6</td>
<td>Level 2: the level of implicit (deductive/interpretative) Understanding</td>
<td>Concludes the meanings that have not been declared in the readable text.</td>
<td>2.26</td>
<td>75.3</td>
</tr>
</tbody>
</table>

Arithmetic mean and relative weight of level II 2.39          79.7

<table>
<thead>
<tr>
<th>No.</th>
<th>Level 3: the level of critical understanding (orthotic)</th>
<th>Distinguish between the facts and the ideas contained in the text.</th>
<th>2.49</th>
<th>83</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Level 3: the level of critical understanding (orthotic)</td>
<td>Ruling on the text in the light of past experience.</td>
<td>2.41</td>
<td>80.3</td>
</tr>
<tr>
<td>3</td>
<td>Level 3: the level of critical understanding (orthotic)</td>
<td>Evaluates the ideas contained in the text in terms of the contextual interrelationship of text.</td>
<td>2.36</td>
<td>78.7</td>
</tr>
<tr>
<td>4</td>
<td>Level 3: the level of critical understanding (orthotic)</td>
<td>The authenticity of the read material and its suitability for the age shall be judged.</td>
<td>2.33</td>
<td>77.7</td>
</tr>
<tr>
<td>5</td>
<td>Level 3: the level of critical understanding (orthotic)</td>
<td>Assesses what is relevant and what is not.</td>
<td>2.29</td>
<td>76.3</td>
</tr>
<tr>
<td>6</td>
<td>Level 3: the level of critical understanding (orthotic)</td>
<td>Supports controlled issues contained in the readable text.</td>
<td>2.3</td>
<td>76.7</td>
</tr>
</tbody>
</table>

Arithmetic mean and relative weight of level 3 2.36          78.7

**Conclusion**

Reaching (20) skills of reading comprehension skills, divided by (3) levels of the President, specialists saw their suitability for the Arabic language book for the first grade. Adoption of (19) skills of reading comprehension skills, the crisis for the Arabic language book for the first grade intermediate, and exceeded (75%) From the opinion of the sample, from the point of view of the Arabic language teachers. To introduce the teaching skills of the study (19), which is necessary for the Arabic language book for the first grade, and therefore recommends that the study should be based on these skills and be taken into account by the authors of the reading methods when building and composing the Arabic language curriculum, and to work on its development and impart For students in a reading lesson.
during educational situations.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education/University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

References


2. Al-Aouar, Hamiri Yahya Mohammed: The extent to which second-grade secondary students were able to understand the skills of reading in the Republic of Yemen, an unpublished master’s thesis, College of Education, Sana’a University, 2007.


4. Khazaleh MS, Hussain AS. Educational strategies and educational communication skills, Dar Safa, 2011.


10. Mjaur MS. teaching Arabic at the secondary level, foundations and educational applications, Cairo, Dar Al-Fikr Al Arabi, 1998.


13. Musa MI. The impact of the strategy beyond knowledge in improving the reading patterns and awareness beyond knowledge and the production of questions among the students of the preparatory stage, the first scientific conference of the Egyptian Association for Reading and Knowledge, Volume 1, Ain Shams University, College of Education, Cairo, 11 -13 July, 2001.

The Impact of Yowadi’s Strategy on the Acquisition of Rhetorical Concepts to Develop the Habits of Mind for Students is the most honorable science

Fatima Nouri Bahaa Al-Moussawi1, Zeina Ghani Abdul-Hussein Al-Khafaji1, Jalal Aziz Farman Al-Barqawi1

1University of Babylon / Faculty of Basic Education / Iraq

Abstract

The objective of the research was to identify the effect of Jawadi’s strategy in acquiring the rhetorical concepts of the fifth graders. The researcher adopted the empirical research method as a methodology for its research procedures, which includes a separate variable (Yawadi strategy, the usual method), and a dependent variable (acquisition of rhetorical concepts) In order to obtain accurate and objective results, the following variables were computed: (the age of time calculated in months, the academic achievement of the parents, the grades of the first semester of the Arabic language, Bar previous information, and test Ravn). After the equivalence between the two research groups, the researcher prepared the application requirements of the plans, objectives and test for the two groups of research. After the application of the experiment, the researcher applied its research tools to the two research groups. After correcting the students’ answers, the researcher obtained the data for the experimental group and the control. (t-test) for two independent samples. The results showed that the experimental group, which was studied according to the Yawadi strategy, exceeded the control group studied in the normal way in the acquisition variable.

Key words: The strategy of the Yawadi, the acquisition of rhetorical concepts, fifth grade literary students, rhetoric.

Introduction

The language is a natural gift, God’s gift to man, to be his way to know himself first and then knowledge of the universe after that, it is a live and honest translation of a people to reveal the beads material and moral together, and is originally a social tool made by society to symbolize the elements of his life and ways of behavior. It is a system of symbols and spoken sounds that are used to communicate, understand and participate in conveying the meaning and conveying the idea. It has different characteristics and characteristics. It is a means and a tool for transmitting cultures, including Arabic. It is the language of the Holy Quran. The Arabic language is divided into sections for each branch of the article. These branches are not the language in themselves, but are used to control the means of linguistic communication. The attention to these branches is not fruitful unless they are related to the Arabic language itself. Since rhetoric is one of the branches of the Arabic language, we need to take care of its study and teaching and to learn the secrets of its beauty through its science, which is the most honorable science in learning. The eloquence is a great function is to express the precise meanings reached by the owner of a summit in himself, and informs his intention to listen to him in a technical way deepen the choice, from the briefness of words and good design, and elegance in drafting, and wonderful in photography, And Ronga. Concepts are more relevant to the learner’s life, helping him to adopt the functions of science in interpreting phenomena that attract attention in the environment to help guide and predict any activity that may lead to the discovery of new things. In addition, it is a group of things, accidents, or special symbols

Corresponding author:
Fatima Nouri Bahaa Al-Moussawi.
University of Babylon / Faculty of Basic Education /
Methods of Teaching Arabic Language;
E-mail: Fatimaalmusawi849@gmail.com
that are grouped together on the basis of their common characteristics that distinguish them from other groups and categories. Helping students to learn concepts is an essential learning objective. School and the basis of the process of thinking, and those important concepts that must be learned and acquired are rhetorical concepts. Al-Balajah is the path leading to understanding the book of Allah and the words of the Arabs. Therefore, the ancient scholars have given great importance to this science. They have put many studies in the original and the proper approach. Without the delinquency of literary life in the late centuries to the tradition, the rhetoric has remained vibrant but the literature of wilting has become frozen. And the causes of weakness in rhetoric as many as confirmed by educational research conducted in this regard has confirmed the apparent weakness in learning and education, and this phenomenon of weakness is a complex phenomenon and many reasons may be the cause of the same rhetoric as if the subjects are many and complex and have many definitions and details. You need more explanation, clarification and analysis. There are some important terms that should be clarified as follows:

Yowadi’s strategy: procedural words because they depict sequential actions or tools to solve problems by focusing on procedural knowledge and remembering them to facilitate the acquisition of skill and sequence processes. (Qatami, 2013: 287).

Acquisition: “It is the ability of the learner to know, understand and apply the fundamental features of the concept.

Concept: “It is not the name or the term but the content of the name or term and what each means, and the content of this name or term changes and grows by acquiring new experiences and moving from one study stage to another.

Allegorism: “It is identical with the fluency of his words, which defines the laws governing the literature and its texts”.

Acquired concepts in the brain, which is the center of the nervous system in humans and animals, and controls all organs of the body through many functions, including vision, thinking and movement or doing any complex or simple activity. Information processing takes place as scientists view the individual as a complex and unique system of information processing. His interpretation of this system stems from a number of assumptions that have made him a new trend in studying processes of attention, perception, learning, and human memory. In the field of cognitive psychology, the process of information processing represents an organized and harmonious series of mental activities that began from sensation and attention through perception, memory and other mental activities. The three processes of perception, sensation and attention are interrelated and sequential processes. You cannot pay attention to something unless there is an alarm or a stimulant that stimulates the specialized neurons in the various sensory organs by detecting stimuli and stimuli through the discovery element or the receptor. Of a particular type of stimulant, which leads to the conversion of these stimuli or stimuli to the signals or impulses of electrons and chemical sent to the brain that the physiological responses to attention such as: Extend the blood vessels in the head, constriction of external blood vessels, etc., all of which help to prepare the organism for attention by contributing to: Facilitate the efficient and efficient reception of the stimuli and prepare the human to respond quickly, especially if this response is required. Is a product of a series of cognitive processes that mediate between receiving this stimulus and producing the appropriate response. The time between the reception of the stimulus and the corresponding response production depends on the nature and quality of the cognitive therapies. Where the strategy adopted by Yoadi steps on the operations and functions, including the sense and awareness and attention that lead to the subsequent processing of information, and steps as follows: The school then memorizes the concept, and then the students repeat the concept by the whole class aloud. One of the students writes the concept on the blackboard, then the school uses a familiar style for being related to the concept, then draws the analogy or uses a picture or an outline of the concept to divide the concept into The school then analyzes the texts in the course book and explains the material with questions to the students to draw their attention. After completing the explanation and clarification, the strategy procedures are done by asking the students to draw a mental outline on the subject of the lesson or concept and its sections in any way to make sure that the students understood the lesson and can remember a For a topic in a sequential way, then reaching the generalization by mentioning the definition of the concept and giving examples (Qatami, 2013: 301).
Methodology

It includes a description of the procedures that have been carried out to achieve the research objectives, starting with the research methodology and experimental design, defining the research community and its design, the equivalence of the research groups (control and experiment), preparation of the research requirements and tools, Experimental Design: The researcher used experimental design with partial control of two equal groups, one experimental and the other control. Search community and design: The current research community consists of fifth grade students in the preparatory schools affiliated with the General Directorate of Babil province for the academic year (2017-2018), which is located within the center of Babil province, after the researcher identified the school in which she is applying, The researcher and the book of the Directorate of Education of Babylon, and its grandmother includes two divisions, and in a random drawing method chose B to represent the experimental group, and a division to represent the control group. The number of female students in the two research groups was 67 students. (30) in the experimental group, and (32) in the sample The control group. My search group parity: The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment. Although the researcher chose the two groups in the random drawing method, although the sample of the research from the social and economic environment is very similar and study in one school, The results of parity between the two research groups showed that the number of students in the first semester in the Arabic language for the academic year (2017-2018) and the previous information test, The two research groups are equivalent to the variables mentioned earlier. Adjust variables: Although the researcher investigated the equivalence of the two sets of research in some variables that it believes affect the course of the experiment, it tried to avoid the effect of some extraneous variables in the course of the experiment. Some of these variables and how to control them are as follows: Accidents associated with the experiment: Any emergency or accident that obstructs its progress, Experimental extinction: No interruption or transfer occurred to any student or length of the experiment. Sample selection: The two groups were randomly selected and the two groups were confirmed. The maturity factor: Since the duration of the experiment was uniform between the two groups, and the age of the students in the two groups was very similar, so the growth of the two groups would return to the same level. , Effect of Experimental Procedures: The researcher worked to limit the effect of experimental procedures that could affect the dependent variable during the course of the experiment. Preparation of research requirements: The research requirements are fundamental to the research, according to which the research procedures are carried out. These requirements are as follows: (The scientific material is the scientific material that the researcher is teaching to the students of the research groups during the period of the experiment The academic year (2017-2018), the scientific article (13) topics from the book of rhetoric, Formulation of Behavioral Goals The researcher formulated 74 behavioral objectives based on the general objectives and the content of the material covered by the experiment according to the Bloom classification in the field of knowledge distributed between the three levels (knowledge, understanding, application), preparation of the teaching plans, The number of plans (13) was a plan, and the researcher presented a sample of them to a group of experts specialized in the methods of teaching the Arabic language to express their views on the soundness of its formulation and after taking their observations, it became its final form and its application.

Search Tool: The acquisition of rhetorical concepts: It is a set of stimuli (oral, written, picture, drawing, or device questions) that have been prepared in a systematic way to measure a sample of content in a quantitative way or to predict what may happen to a phenomenon or situation and give a degree or value to the examinee, And sets a measure of the phenomenon or situation (Tal and Isa, 2007: 80-81), and there are several steps in which the preparation of the test to acquire the concepts of rhetoric is as follows: Determine the purpose of the test: The purpose of the test is to measure the extent to which the students of the literary fifth acquired the rhetorical concepts in the language of rhetoric, according to the behavioral goals that were formulated from the scientific material. Setting test objectives: After the purpose of the test was determined to acquire the rhetorical concepts, the objectives of the test are determined to determine the extent of their achievement. The researcher formulated a number of behavioral goals.

Select the test paragraphs: The researcher determined the number of paragraphs to be composed of the test of acquisition of rhetorical concepts as the number of paragraphs of the test (39) paragraph.
Test Instructions: Specific instructions and instructions were formulated on how to answer (selecting one correct alternative to the paragraph, answering all paragraphs, the time period for answering, writing the triple name, the row and the division in the assigned space).

Correct the test answers: After the objective test paragraphs were formulated from a 39-paragraph multiple choice type, a standard was developed to correct the answers. One (one grade for each correct test paragraph) and 0 for the wrong answer and the abandoned paragraph that the students did not The highest final score for the acquisition of rhetorical concepts is (39) degrees and the lowest (zero). Sincerity test: The authenticity of the test was verified and the content was validated. The results showed that the virtual honesty obtained 80% by the arbitrators and the specialists, either the validity of the content. The results showed that all the clauses of the test of acquisition of the rhetorical concepts are statistically significant. In measuring students’ acquisition of rhetorical concepts.

Statistical Methods: The researcher used the t-test equation for two independent samples to make the equivalence between the experimental and control groups in the following variables (the age of the months calculated, the academic achievement of the parents, and the first semester of the students).

Results and Discussion

The students of the experimental group who studied according to Jawadi’s strategy surpassed the students of the control group who studied according to the usual method in the test of acquisition of rhetorical concepts. Table (2) shows this.

| Table (1) The arithmetic mean and variance and the calculated value (t) obtained by the students of the two groups in the test of acquisition of rhetorical concepts |
| --- | --- | --- | --- | --- | --- |
| Statistical significance | value (t) | Degree of freedom | variance | SMA | the group |
| tabular | Calculated | | | | |
| At a significance level of (0.05) | 2 | 32,37 | 3 | 28,20 | 27,10 | Experimental |
| | | | | 27,67 | 22,91 | Control |

Conclusions

In the light of the research results, the researcher reached the following conclusions: The use of Jawadi’s strategy contributes to the organization of the process of teaching rhetorical concepts in a sequential, interrelated and integrated way and enhancing their learning abilities.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon / Faculty of Basic Education / Iraq and all experiments were carried out in accordance with approved guidelines.

References

6. Suman AI. Arabic Language and Methods of Teaching for Students of the First Basic Stage, 1/1, Dar Al Kunooz Scientific Knowledge for Publishing


Thyroid Status in Iraqi Subfertile Women: a Case Control Study

Hyfaa Abdulhasan Raffas¹, Hussein Abdulzahra Al-janabi², Raheem Ghadhab Jawad²
¹Gynecology specialist / Al-Diwaniyah Child and Maternity Hospital / Department of Obstetrics and gynecology / Al-Diwania / Iraq, ²General Surgeon / Al-Diwaniyah Teaching Hospital / Department of Surgery / Al-Diwania / Iraq

Abstract

Aim of the study: to evaluate the thyroid hormone status in a group of subfertile Iraqi women in comparison with fertile women of comparable age. The present case control study included 50 infertile Iraqi women serving as study group and 30 fertile women of comparable age serving as control group. The study has been carried out in Al-Diwaniyah maternity and child teaching hospital in Al-Diwaniyah province in the Mid-Euphrates region of Iraq. Venous blood sample was obtained from each woman in order to assess T3, T4 and TSH hormonal levels. Hormonal assay was done using Mini-Vidas Immunofluorescence Hormonal assay machine, at the central Biochemistry lab, AL-Diwaniyah Teaching Hospital. Taking the reference range of both serum T3 and serum T4, no women, whether in the control group or in the study group, had a value neither higher nor lower than normal, that is all subjects were within normal reference ranges. On the other hand, mean serum TSH was significantly higher in infertile women in comparison with control group, 3.04 ± 1.39 versus 2.52 ± 1.08 mIU/L (P = 0.027), and that significant proportion of infertile women had higher than normal TSH serum level, 7 out of 50 (14.0 %).

Key words: Thyroid status, infertility, Iraq

Introduction

Infertility is defined “by the International Committee for Monitoring Assisted Reproductive Technology (ICMART) and WHO as the ‘failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse’” (1). Infertility affects approximately 48.5 million couples globally (2); in other words it affects about 8 to 12 % of couples during the reproductive age (3). The incidence of subfertility and infertility in the Iraqi community has been rising since 2000 because of a number of factors such as changes in lifestyle, the second and the third Gulf wars, increasing smoking, occupation and probably the contribution of hereditary factors (4). Causes of infertility may be categorized as male factor, female factor, combined and unexplained (5-7). Causes of infertility in women may be attributed to anatomical, functional and genetic defects and the prevalence of these causes shows significant geographic variations among nations worldwide (7). Systemic disorders such as diabetes mellitus (8), renal causes (9) and endocrine problems (10) are among the long list of causes of female infertility. Thyroid abnormalities have been studied in association with female subfertility (11-14); however, significant controversy exists in the available published articles so that clear judgment about the exact bi-directional relationship between thyroid function and fertility is still incompletely understood. Symptomatic hyperthyroid status causes changes of estradiol metabolism and the hyper-responsiveness of gonadotropin to stimulation by gonadotropin-releasing hormone. Baseline gonadotropin levels are also often higher than normal. The prevalence of irregular cycle in women suffering from hyperthyroidism was previously high; however, the early detection and prompt management resulted in less prevalent cycle irregularities in those women (15). The number of studies

Corresponding author:
Hyfaa Abdulhasan Raffas.
Gynecology Specialist / Al-Diwaniyah Child and Maternity Hospital / Department of Obstetrics and Gynecology / Al-Diwania / Iraq
highlighting the prevalence of infertility in association with hyperthyroidism is relatively low and the majority of these studies is retrospective and is of small size. Infertility prevalence, whether primary or secondary, in women with hyperthyroidism has been estimated in the range between 0.9 – 5.8 %; however, the exact association between hyperthyroid status and infertility in women remains to be disclosed (11). Disturbed ovarian function, increased rate of abortion, abnormal menstruation and subfertility have all been linked to hypothyroidism in addition to the observation that these abnormalities get improved when hypothyroid status is corrected following administration of therapeutic thyroxin hormone (11). When the level of thyroid stimulating hormone is high despite normal free thyroxin level, the condition is termed subclinical hypothyroidism (16) and it has been linked to sub-fertility with a wide range of prevalence, 0.7% up to 43 % (17). Nonetheless, the available data are inadequate to clearly label and association between subclinical hypothyroidism and infertility in women (11). The lack of clear association between thyroid status and subfertility and the rarity of Iraqi literatures dealing with this subject encouraged us to plan and conduct the current study aiming at defining the thyroid hormone status in a group of subfertile Iraqi women in comparison with fertile women of comparable age.

Methodology

The present case control study included two groups. The first group was comprised of 50 infertile Iraqi women serving as study group and the second group included 30 fertile women of comparable age serving as control group. The study started on June 2018 and ended on February 2019 and it has been carried out in Al-Diwaniyah maternity and child teaching hospital in Al-Diwaniyah province in the Mid-Eastern region of Iraq. Each women enrolled in the current study was informed about the aim and the procedures of the study and verbal consent was obtained from all women. The study was approved by the Ethical Approval Committee of The College of Medicine / University of Al-Qadisiyah. Venous blood sample was obtained from each woman in order to assess T3, T4 and TSH hormonal levels. Hormonal assay was done using Mini-Vidas Immunofluorescence Hormonal assay machine, at the central Biochemistry lab, AL-Diwaniyah Teaching hospital. Statistical analysis was carried out using version 23 of the SPSS statistical software and Microsoft Office Excel 2010. Numeric data were expressed as mean and standard deviation while nominal data were expressed as number and percentages. Independent samples t-test was used to study mean difference in hormonal levels between study and control groups. Chi-square test was used to study associations among nominal variables. The level of significance was considered at $P \leq 0.05$.

Results and Discussion

Mean age of infertile women was $29.22 \pm 7.06$ years and it ranged from 14.28 to 43.97 whereas, mean age of control group was $28.97 \pm 6.08$ years and it ranged from 20.06 to 43.06 years. There was no significant difference in mean age between study and control groups ($P = 0.840$). Mean body mass index of infertile women was $24.72 \pm 3.43$ kg/m² and it ranged from 19.25 - 33.05 kg/ m² while mean BMI of control group was $25.03 \pm 3.48$ kg/m² and the range was from 19.81 to 32.52 kg/m². There difference in mean BMI between control and study groups was insignificant ($P = 0.636$), as shown in table 1. Infertile women with primary infertility accounted for 9 out of 50 (18 %); whereas those with secondary infertility accounted for 41 out of 50 (82 %), as shown in figure 1. Regarding thyroid status, the range of serum T3 and T4 levels of infertile women was within normal range, 1.01 - 2.15 nmol/L and 67 – 115 nmol/L, respectively. The same finding was observed also in control subjects, 1.12 -2.25 nmol/L and 59 -145 nmol/L, table 2. In addition, there was no significant difference in mean serum T3 as well as serum T4 between study and control groups, $1.61 \pm 0.28$ versus $1.57 \pm 0.28$ nmol/L and 90.34 $\pm$ 11.64 versus $86.2 \pm 15.57$ nmol/L, respectively ($P > 0.05$), table 2. Taking the reference range of both serum T3 and serum T4, no women, whether in the control group or in the study group, had a value neither higher nor lower than normal, that is all subjects were within normal reference ranges, table 2. On the other hand, mean serum TSH was significantly higher in infertile women in comparison with control group, $3.04 \pm 1.39$ versus $2.52 \pm 1.08$ mIU/L ($P = 0.027$), table 2, and that significant proportion of infertile women had higher than normal TSH serum level, 7 out of 50 (14.0 %), table 2. Serum T3 showed significant negative correlation with BMI, $r = -0.317$ and $P = 0.025$. TSH showed significant positive correlation with BMI, $r = 0.323$ and $P = 0.022$, as shown in table3. The present study showed that infertile women had essentially normal serum total T3 and T4 levels; however, their mean serum TSH was significantly higher than that of control group and
that significant proportion, 14% had serum TSH level higher than reference range. These findings suggest that significant proportion of infertile women had subclinical form of hypothyroidism and that it may be at least in part participating in the pathophysiology of infertility in those women. In a Danish study, it was found that subclinical hypothyroidism was significantly associated with infertility (18). In another study (19), carried out in Argentina and included 244 infertile women the prevalence rate of subclinical hypothyroidism was seen in 13.9% and that the association between infertility and subclinical hypothyroidism was highly significant, a finding that is similar to the finding of the present study. Normal functioning thyroid gland is critical for conception to be successful and the outcome of pregnancy to be fruitful (20). Hypothyroid females with TSH levels >15 mIU/L possess a high rate of menstrual irregularities in comparison with women who are euthyroid (21). Indeed clinically overt hypothyroidism is significantly associated with risk of infertility in most published literatures; however, data linking between infertility and subclinical hypothyroidism is controversial. A prospective study including 538 women revealed that the mean TSH concentration was significantly higher in women with infertility in comparison with apparently healthy fertile women; however, the difference in the proportion of women with higher than normal TSH between the two groups was insignificant (22). Another cross-sectional study evaluated the sera of 704 infertile women undergoing found that the prevalence rate of women with a higher than normal TSH concentration was 2.3%, which is lower than that found in our study. Nonetheless, other authors have proposed that subclinical hypothyroidism, in agreement with our finding, is more prevalent in infertile women (23, 24). Indeed, there is some shortage in data evaluating the effect of subclinical hypothyroidism on fertility because of varied definitions of condition (variable TSH limits) and absence of sufficient control participants. Actually the “American Society for Reproductive Medicine” deny the association between infertility and subclinical hypothyroidism (25). The clinically mild form of hypothyroidism, subclinical hypothyroidism, is defined as a higher than normal serum TSH level in the presence of normal free thyroxine (FT4) levels (26). It is a frequent finding among women during reproductive age accounting for 4 to 8%; therefore it may affect negatively women planning pregnancy (27). Because of the nonspecific symptoms that accompany hypothyroidism (e.g., fatigue), the characterization of subclinical hypothyroidism is based principally on hormonal study (28). We suggest that the available evidence in the current study, supported by similar opinions of previous literatures that infertile women should be investigated for subclinical hypothyroidism and should receive appropriate management if proved so.

### Table 1: Mean age and BMI in control and study groups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Statistic</th>
<th>Control group n = 60</th>
<th>Study group n = 50</th>
<th>P †</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Mean ± SD</td>
<td>28.97 ± 6.08</td>
<td>29.22 ± 7.06</td>
<td>0.840</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>20.06 - 43.06</td>
<td>14.28 - 43.97</td>
<td>NS</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>Mean ± SD</td>
<td>25.03 ± 3.48</td>
<td>24.72 ± 3.43</td>
<td>0.636</td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>19.81 - 32.52</td>
<td>19.25 - 33.05</td>
<td>NS</td>
</tr>
</tbody>
</table>
Table 2: Thyroid function tests in control and study groups

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Statistic</th>
<th>Control group</th>
<th>Study group</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>( n = 60 )</td>
<td>( n = 50 )</td>
<td></td>
</tr>
<tr>
<td>T3 (nmol/L)</td>
<td><strong>Mean ± SD</strong></td>
<td>1.57 ± 0.28</td>
<td>1.61 ± 0.28</td>
<td>0.477 *</td>
</tr>
<tr>
<td></td>
<td><strong>Range</strong></td>
<td>1.12 - 2.25</td>
<td>1.01 - 2.15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low (&lt; 0.9)</td>
<td>0 (0.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal (0.9 - 2.8)</td>
<td>60 (100.0 %)</td>
<td>50 (100.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (&gt; 2.8)</td>
<td>0 (0.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Mean ± SD</strong></td>
<td>86.2 ± 15.57</td>
<td>90.34 ± 11.64</td>
<td>0.123 *</td>
</tr>
<tr>
<td>T4 (nmol/L)</td>
<td><strong>Range</strong></td>
<td>59 - 145</td>
<td>67 - 115</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low (&lt; 58)</td>
<td>0 (0.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal (58 - 161)</td>
<td>60 (100.0 %)</td>
<td>50 (100.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (&gt; 161)</td>
<td>0 (0.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Mean ± SD</strong></td>
<td>2.52 ± 1.08</td>
<td>3.04 ± 1.39</td>
<td>0.027 *</td>
</tr>
<tr>
<td>TSH (mIU/L)</td>
<td><strong>Range</strong></td>
<td>0.5 - 4.2</td>
<td>0.8 - 4.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low (&lt; 0.5)</td>
<td>0 (0.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal (0.5 - 4.7)</td>
<td>60 (100.0 %)</td>
<td>43 (86.0 %)</td>
<td>0.003 †</td>
</tr>
<tr>
<td></td>
<td>High (&gt; 4.7)</td>
<td>0 (0.0 %)</td>
<td>7 (14.0 %)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Correlations of thyroid hormones to age and BMI in study group

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Age</th>
<th>BMI</th>
<th>Fertility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( r )</td>
<td>( P )</td>
<td>( r )</td>
</tr>
<tr>
<td>T3</td>
<td>0.039</td>
<td>0.786 NS</td>
<td>-0.317</td>
</tr>
<tr>
<td>T4</td>
<td>0.162</td>
<td>0.261 NS</td>
<td>-0.235</td>
</tr>
<tr>
<td>TSH</td>
<td>-0.043</td>
<td>0.767 NS</td>
<td>0.323</td>
</tr>
</tbody>
</table>

Figure 1. Pie chart showing types of infertility in study group
Conclusion

available evidence in the current study, supported by similar opinions of previous literatures that infertile women should be investigated for subclinical hypothyroidism and should receive appropriate management if proved so.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Gynecology specialist / Al-Diwaniyah child and maternity hospital / Department of Obstetrics and gynecology / Al-Diwania / Iraq and all experiments were carried out in accordance with approved guidelines.

References


Prevalence of Back Pain and its Socio-Demographic, Postural and Behavioral Associated Factors among Primary Schoolchildren in Baghdad City

Nawar Sahib Khalil¹, Mazin Ghazi Jasim Alrubaey¹

¹Family and Community Medicine Department, Mustansiriyah University, College of Medicine, Iraq

Abstract

To identify back pain prevalence and its socio-demographic, postural and behavioral associated factors among primary schoolchildren in Baghdad city.

This study conducted at a random sample of 4667 pupils from multistage random sampling of 79 primary schools within Baghdad city, using developed, validated and piloted questionnaire form. Chi-square test was used for test the associations between back pain as outcome variable and socio-demographic, postural and behavioral factors as independent variables. Multivariate logistic regression was used to find out the predictors for back pain.

The prevalence of back pain during last month prior to study was 43.4%. Back pain was significantly associated with socio-demographic, postural and behavioral factors. Multivariate analysis showed that, positive parent history, sleeping, sitting and lifting postures, physical exercise and its frequency, time spent in sedentary activities and habit of bed’s study are significant predictors expected to increase back pain prevalence among primary schoolchildren.

The prevalence of back pain is high and suggesting the necessity for increasing the awareness of general public about risk of back pain among children.

Keywords: Pupils, back pain, prevalence.

Introduction

Back pain among schoolchildren were largely ignored until recently owing to the perception that they are less vulnerable, uncommon in clinical setting and it’s not fatal nature¹².

Recently, musculoskeletal health particularly of this age group has been a global health concern³, especially after World Health Organization (WHO) declaration of the years 2000–2010 as a bone and joint decade owing to realization the potential of musculoskeletal problems that impair the health of societies⁴.

Globally, there has been an ongoing concern of back pain among schoolchildren for education and health authorities as well as for communities at large, as a complain starts early in life could accelerate during teenage up to adulthood and its early life presence is considered as a precursor for adult’s back pain⁵⁶.

Over last decade, several studies revealed that back pain among schoolchildren were not uncommon and increasing, indeed, its prevalence sometimes similar to that reported for adults⁷ which varies from 11 to 86% depending on the regions.

Several reviews have been demonstrated that more than 85% of back pain among children is not due to a specific single condition, but to a set of factors including socio-demographic, postural and behavioral habits³⁸⁹.

As widely accepted that children are the future productive of any nation; therefore, early detection of their health problems and prevention from long-term sequels is of greatest significant¹⁰.

DOI Numbers: 10.5958/0976-5506.2019.00787.3
Worldwide alteration in lifestyle of current generations leads children to be largely stressed, overweighted, and experienced either physical inactivity or stressful ones that negatively influence back comfort. Iraqi children specifically after 2003 are not so far from these alterations particularly sedentary lifestyle as they indoor most of times for either security or recreational reasons as they have been opened to all aspects of westernization and globalization.

To best of our knowledge, no epidemiological study was conducted locally regarding this problem among this target-group, thus this study aiming to have local baseline database about back pain prevalence and identifying its associated factors among primary schoolchildren.

Materials and Method

This cross-sectional design study was conducted at random sample of 4667 pupils aged 9+ years old from multistage random sampling of 79 public primary schools within Baghdad city; from November 2017-April 2018. All sixth Kharkh and Russafa Educational Directorates and all urban sectors within such directorates were selected as first and second stage respectively. Third stages include sample of primary schools stratified by schools type were selected from chosen sectors by simple random sampling. Similarly, one class from each of 4th-6th grades within selected schools was chosen by simple random sampling as fourth stage. At fifth stage, within selected classes, pupils were chosen through systematic random sampling.

The inclusion criteria include pupils in 4th-6th grades who brought back informed consent and generally healthy. Pupils who forgot to bring consent back or those who have disabilities or diseases related back pain were excluded.

Questionnaire form was developed by authors based on published researches. However, it revised and modified by Experts and piloted on 90 pupils who were not included in the final study.

The questionnaire consists of four sections. The first section was related to socio-demographic characteristics included age, grade, gender, parent’s education and back pain history.

The second section was related to back pain and its location. The pupils were inquired that whether or not they experienced back pain during the last month prior to the study. The last month recall period was chosen to minimize recall bias. The site was indicated by body map picture exhibiting four body regions (the neck, shoulders, upper- and lower-back) that derived from Greek study.

The third section was related to postural habits that measured by modified items derived from Brazilian studies which based in present study on parents’ observations to get more reliable non-subjective responses. The postural habits included postures adopted during sleeping (supine, prone or lateral decubitus); sitting posture when writing or using computer; and during lifting objects from floor. The latter three postural habits were illustrated by alternatives pictures derived from Portuguese study for aiding parents to select their children often manner during performing such activities.

The fourth section includes the behavioral habits questions that borrowed and modified from other studies. It was assessed by author-asked the pupils whether or not they practicing physical exercise and those with yes response they further asked regarding its frequency. Sedentary activities were assessed by inquired the parents about the time in hours that their child spent daily for watching TV or using PC or other electronic devices. The student’s habit of studying on bed was also assessed based on the parent’s observation.

Regarding ethical issue, official permissions were obtained from educational directorates and schools administrations. The written consents were obtained from parents who assured about the confidentiality of information.

The pupils were informed that they have choice for participation regardless their parents’ willing. The interview was done in last-desk within classroom or in the lab accompanied by teacher for privacy.

Data collection was done by one author. Selected pupils who preliminary accepted for participation were provided with consent. Out of 5000 distributed questionnaires, 4667 pupils returned it back made 93.3% response rate, for whom, interviews were done individually during 5 minutes average.

Data were entered and analyzed by SPSS version 25. Chi-square test was used to assess associations between back pain and pupils’ socio-demographic, postural
and behavioral habits. Any significant associations by bivariate (Chi-square) analysis were further analyzed by multivariate (Binary logistic-regression) analysis to determine the predictors for back pain independently. P value <0.05 was set significant for all tests.

RESULTS

Out of 4667 studied pupils, 2024 (43.4%; 95% CI: 41.9-44.8) were experienced back pain during last month prior to study. Girls (46%) experienced back pain more than boys (41%) (10.640, P= 0.001) (Figure 1). Among sufferers, shoulder was the maximum reported site (Figure 2).

Results related to socio-demographic characteristics are shown in Table 1. Those related to postural and behavioral habits are shown in Tables 2. Bivariate analysis revealed that back pain was highly prevalent among pupils who aged 13-14 years (70%), in the sixth grade (47%), whose father and mother had intermediate and lower education, and those whose parents had positive back pain history (75.5%) (Table 1).
Table 1. Association between back pain and socio-demographic factors.

<table>
<thead>
<tr>
<th>Socio-demographic factors</th>
<th>Back pain</th>
<th>n (%)</th>
<th>%</th>
<th>OR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>(%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9-10 years</td>
<td>865</td>
<td>37.0</td>
<td>2339</td>
<td>50.1</td>
</tr>
<tr>
<td>11-12 years</td>
<td>1036</td>
<td>48.1</td>
<td>2152</td>
<td>46.1</td>
</tr>
<tr>
<td>13-14 years</td>
<td>123</td>
<td>69.9</td>
<td>176</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>627</td>
<td>40.7</td>
<td>1539</td>
<td>33</td>
</tr>
<tr>
<td>Fifth</td>
<td>656</td>
<td>42.2</td>
<td>1555</td>
<td>33.3</td>
</tr>
<tr>
<td>Sixth</td>
<td>741</td>
<td>47.1</td>
<td>1573</td>
<td>33.7</td>
</tr>
<tr>
<td><strong>Father education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>76</td>
<td>80</td>
<td>95</td>
<td>2.0</td>
</tr>
<tr>
<td>Primary</td>
<td>566</td>
<td>78.2</td>
<td>724</td>
<td>15.5</td>
</tr>
<tr>
<td>Intermediate</td>
<td>739</td>
<td>72.7</td>
<td>1016</td>
<td>21.8</td>
</tr>
<tr>
<td>Secondary</td>
<td>314</td>
<td>28.5</td>
<td>1103</td>
<td>23.6</td>
</tr>
<tr>
<td>University</td>
<td>284</td>
<td>19.2</td>
<td>1483</td>
<td>31.8</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>45</td>
<td>18.3</td>
<td>246</td>
<td>5.3</td>
</tr>
<tr>
<td><strong>Mother education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>218</td>
<td>88.3</td>
<td>247</td>
<td>5.3</td>
</tr>
<tr>
<td>Primary</td>
<td>651</td>
<td>75.6</td>
<td>861</td>
<td>18.4</td>
</tr>
<tr>
<td>Intermediate</td>
<td>681</td>
<td>65.5</td>
<td>1040</td>
<td>22.3</td>
</tr>
<tr>
<td>Secondary</td>
<td>208</td>
<td>20.3</td>
<td>1027</td>
<td>22.0</td>
</tr>
<tr>
<td>University</td>
<td>243</td>
<td>17.9</td>
<td>1356</td>
<td>29.1</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>23</td>
<td>16.9</td>
<td>136</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Back pain parent history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>196</td>
<td>8.7</td>
<td>2246</td>
<td>48.1</td>
</tr>
<tr>
<td>Yes</td>
<td>1828</td>
<td>75.5</td>
<td>2421</td>
<td>51.9</td>
</tr>
</tbody>
</table>

*a* Bivariate analysis. Pearson Chi-square test.

*b* Significant at logistic-regression (*P*<0.05).
Back pain was more prevalent among pupils who adopted prone sleeping position (88%), those who adopted unsuitable postures when sitting for writing (68%), using PC (67%) or lifting objects from floor (70%), those who did not perform physical exercises regularly (81%), or perform it 5+ days weekly (53%), those who spent 6+hours /day for watching TV or using PC or other electrical devices (92%), and those who have habit of bed study (81%) (Table 2).

Table 2. Association between back pain and postural and behavioral factors.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Back pain</th>
<th>n</th>
<th>%</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Postural factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supine</td>
<td>212</td>
<td>24.1</td>
<td>879</td>
<td>18.8</td>
<td>2087.278</td>
</tr>
<tr>
<td>Prone</td>
<td>1461</td>
<td>87.7</td>
<td>1666</td>
<td>35.7</td>
<td>2.572</td>
</tr>
<tr>
<td>Lateral</td>
<td>351</td>
<td>16.5</td>
<td>2122</td>
<td>45.5</td>
<td>0.903</td>
</tr>
<tr>
<td><strong>Sitting during writing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitable</td>
<td>103</td>
<td>5.6</td>
<td>1829</td>
<td>39.2</td>
<td>1743.966</td>
</tr>
<tr>
<td>Unsuitable</td>
<td>1921</td>
<td>67.7</td>
<td>2838</td>
<td>60.8</td>
<td>4.690</td>
</tr>
<tr>
<td><strong>Sitting during computer use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitable</td>
<td>146</td>
<td>7.8</td>
<td>1880</td>
<td>40.3</td>
<td>1624.742</td>
</tr>
<tr>
<td>Unsuitable</td>
<td>1878</td>
<td>67.4</td>
<td>2787</td>
<td>59.7</td>
<td>2.535</td>
</tr>
<tr>
<td><strong>Pick-up objects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitable</td>
<td>122</td>
<td>6.3</td>
<td>1931</td>
<td>41.4</td>
<td>1841.013</td>
</tr>
<tr>
<td>Unsuitable</td>
<td>1902</td>
<td>69.5</td>
<td>2736</td>
<td>58.6</td>
<td>4.549</td>
</tr>
<tr>
<td><strong>Behavioral factors</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>695</td>
<td>23.0</td>
<td>3025</td>
<td>64.8</td>
<td>1455.880</td>
</tr>
<tr>
<td>No</td>
<td>1329</td>
<td>80.9</td>
<td>1642</td>
<td>35.2</td>
<td>3.130</td>
</tr>
<tr>
<td><strong>Exercise frequency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2 days/wk.</td>
<td>430</td>
<td>51.1</td>
<td>842</td>
<td>27.84</td>
<td>892.296</td>
</tr>
<tr>
<td>3-4 days/wk.</td>
<td>88</td>
<td>4.8</td>
<td>1849</td>
<td>61.12</td>
<td>1</td>
</tr>
<tr>
<td>5+ days/wk.</td>
<td>177</td>
<td>53.0</td>
<td>334</td>
<td>11.04</td>
<td>2.674</td>
</tr>
<tr>
<td><strong>Watching TV/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1 hour</td>
<td>227</td>
<td>9.3</td>
<td>2431</td>
<td>52.1</td>
<td>2429.106</td>
</tr>
<tr>
<td>2-3 hours</td>
<td>1197</td>
<td>76.2</td>
<td>1570</td>
<td>33.6</td>
<td>2.599</td>
</tr>
<tr>
<td>4-5 hours</td>
<td>507</td>
<td>89.9</td>
<td>564</td>
<td>12.1</td>
<td>2.873</td>
</tr>
<tr>
<td>≥6 hours</td>
<td>93</td>
<td>91.2</td>
<td>102</td>
<td>2.2</td>
<td>10.491</td>
</tr>
<tr>
<td><strong>Computer use/day</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1 hour</td>
<td>355</td>
<td>12.8</td>
<td>2783</td>
<td>59.6</td>
<td>2633.413</td>
</tr>
<tr>
<td>2-3 hours</td>
<td>1199</td>
<td>87.4</td>
<td>1372</td>
<td>29.4</td>
<td>4.753</td>
</tr>
<tr>
<td>4-5 hours</td>
<td>374</td>
<td>91.7</td>
<td>408</td>
<td>8.7</td>
<td>5.748</td>
</tr>
<tr>
<td>≥6 hours</td>
<td>96</td>
<td>92.3</td>
<td>104</td>
<td>2.2</td>
<td>2.815</td>
</tr>
<tr>
<td><strong>Bed’s study</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>389</td>
<td>14.7</td>
<td>2651</td>
<td>56.8</td>
<td>2057.434</td>
</tr>
<tr>
<td>Yes</td>
<td>1635</td>
<td>81.1</td>
<td>2016</td>
<td>43.2</td>
<td>3.425</td>
</tr>
</tbody>
</table>

* Bivariate analysis. Pearson Chi-square test.
Significant at logistic-regression ($P<0.05$).

The output of logistic regression demonstrates that positive parent’s history is expected to increase back pain prevalence by 6 times independently (Table 1). Prone sleeping posture is expected to increase back pain prevalence by 2.6 times, and adoption of unsuitable postures when sitting for writing, using computer or picking objects from floor are expected to increase back pain prevalence by 4.7, 2.5 and 4.5 times independently respectively. None performing physical exercise or too frequent exercise performing (5+days/week) are expected to increase back pain prevalence by >3 and 2.7 times independently. Longer time spent in sedentary activities (6+ and 4-5 hours /day watching TV or using computer) are expected to increase the prevalence of back pain by 10 and 5.7 times respectively. Pupils’ habit of bed’s study is expected to increase back pain prevalence by >3 times independently (Table 2).

**Discussion**

This study illustrated that back pain is not uncommon among Iraqi primary schoolchildren as 43% of sample reported to have such pain which is approximately in the line of global and regional studies[6,8,14,15]. However, our-finding is higher and lower than what was reported by other studies[3-5,13,16]. This variability could be attributed to differences in age of target-group, sample size, and recall period. Our-results revealed that shoulder was the maximum pain site reported which is consistent with other studies[3,4,13].

Concerning the socio-demographic factors, prevalence was higher among eldest age-group which is supported by other studies[3,5,13,16]. This variability could be attributed to differences in age of target-group, sample size, and recall period. Our-results revealed that shoulder was the maximum pain site reported which is consistent with other studies[3,4,13].

Parent’s educations were found to be associated with back pain suggesting that back pain prevalence increased progressively with decreased level of education which supported by Egyptian study[3]. However, parents’ education isn’t found to have significant effect on back pain independently. This might attributed to that back pain might be related to general socio-economic status including family’s living condition reflected by income and providing facilities that ensure proper ergonomic and postures rather than education itself, and such variable could not be measured because of difficulties in gathering such information from our-families.

Parent’s history of back pain was significantly associated with back pain as well as it is found to be a significant predictor that expected to influence back pain prevalence like other studies[6,9,14].

Regarding postural factors, this study found significant association between sleeping posture and back pain prevalence and is found to be as predictor expected to influence back pain prevalence which is supported by Brazilian studies[8,9]. Such finding could support the recommendations regarding proper sleeping position that any sleep position other than recommended is not advisable and could result in load imbalance on the intervertebral discs and facet joints and could interference disc hydration that take-place mainly during sleep[8].

Significant associations were also found between sitting and lifting postures and back pain that are supported by other studies[3,8,9] and simultaneously found as significant predictors that expected to increase back pain prevalence independently.

Regarding behavioral factors, our-study found significant associations between physical exercise and its frequency with back pain and simultaneously are found as significant predictors expected to have effect on back pain prevalence independently which is supported by other studies[9,13] and suggesting the important effect of physical activity in back pain prevention when performed regularly on moderate-basis.

Significant associations were found between sedentary activities and back pain and such findings are in the line of else studies[3,6,8,9,16]. Such activities are found as significant predictors expected to increase back pain odds independently and could indicate an obvious trend of back pain prevalence that increased with increased
time spent in such activities.

Finally, significant association between back pain and pupils’ habit of bed’s study was identified in our-study and is found as predictor expected to influence back pain prevalence independently which is also supported by Brazilian studies\cite{8,9}.

**Conclusion**

Back pain sounds to be common among upper primary schoolchildren and quantify subjective morbidity among Iraqi children. Back pain was significantly associated with socio-demographic, postural and behavioral factors. It is necessary to increase the awareness of general public about risk of children’s back pain as precursor for adulthood back pain.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


The Relationship between Dental Caries in Primary Teeth and Permanent First Molars in Schoolchildren Aged 8-9 Years in Wasit Governorate- Iraq

Hanan F. Abbas
College of Dentistry, Wasit University, Iraq

Abstract

“first molar” has an important role at individual’s dental health among the known risk factors, the experience of previous caries is of the best predictors for future caries. The aim of this study is to determine the relationship between dental caries in primary teeth and permanent first molars. The sample examined in this study consisted of 436 schoolchildren aged 8-9 years in Wasit governorate divided into control group (children with caries free in permanent first molars) and case group (children with at least caries in one permanent first molar) these case group subdivided into four groups according to the value of DMFT of the first molars. All children subjected to clinical examination to obtain information about “dental caries” of permanent 1st molars (DMFT) by assessment of decayed teeth, missing teeth due to caries and filling teeth according to WHO 1997. Also information obtained about dental caries prevalence and severity in primary teeth (dmft/dmfs) by assessment decayed teeth/ surfaces, missing teeth/ surfaces due to caries and filling teeth/ surfaces according to Gruebbl 1944. The data collection started from 1/March to 20/April 2018. Data analyzed using statistics package for social science SPSS Inc, 2016 version 24 for windows and Excel 2007. The mean value of dmft in control group was (3.42 ± 2.30) while in total case group was (5.48 ± 2.25), statistical analysis showed highly significant difference in the mean value of dmft between the two groups. The mean value of dmfs in control group was (0.09 ± 0.07) while in case group was (0.15 ± 0.10), statistical analysis showed significant differences in the mean value of dmfs between the two groups also. It was concluded that caries status in “primary teeth” can be used as a “risk indicators” for predicting caries in “permanent teeth”.

Keywords: caries in primary teeth, dental caries in permanent molars, dental caries in wasit governorate.

Introduction

“Dental caries” still a serious problem in many populations worldwide, with a marked increase of the prevalence and severity in several countries during the last decade. “Caries risk assessment” has been considered one of the principles of oral health promotion. So that by finding the causes and dilemmas of “dental caries” for each person, the correct treatment plan progression of stopping and prevention of new lesion is presented. The relationship between various factors and tooth decay has been shown in a large number of cross-sectional studies. The limitations of these studies in spite of the measurement of the relationship between the factors, they have the power to relate caries and various risk factors have not been mentioned.

Longitudinal studies on development of dental caries in child populations are relatively rare compared to the large number of cross-sectional studies, one aspect of caries development which has received some consideration in past studies is a possible relation between “dental caries” in the primary and the permanent dentition of the same individual. The existence of such a relation be of obvious importance for the planning of dental service of child populations, since it would permit early selection of child with a high probability of developing carious lesions in the permanent dentition. “dental caries” is the most prevalent of all chronic disease among US children, it affects 52% of children ages 6-8 years. High caries prevalence still endures as one of the major oral health issues in children, because “dental caries” is a disease that is both preventable and costly.
to treat, previous studies have focused on identifying caries risk predictors including developmental tooth defect, Mutans Streptococci infection, (time, source and level) Lactobacilli counts, salivary buffer capacity and flow rate, sucrose intake frequency and past caries experiences. Most of these studies, however consisted of a single or several cross-sectional surveys; information validating the correlation between caries in primary and permanent dentition of the same individuals is needed, "first molar" has an important role at individual's dental health among the known risk factors, the experience of previous caries is of the best predictors for future caries.

Materials and Method

The sample examined in this study consisted of 436 schoolchildren aged (8-9) years old in Wasit Governorate, the sample divided into control group (children with caries free in permanent 1st molars DMFT=0) and case group (children with at least one carious permanent 1st molars DMFT). Case group subdivided into four groups according to the value of DMFT of 1st molars, case 1(DMFT=1), case 2 (DMFT=2), case 3 (DMFT=3), case 4(DMFT=4). All children subjected to clinical examination to obtain information about "dental caries" of permanent 1st molars(DMFT) by assessment of decayed teeth, missing teeth due to caries and filling teeth according to WHO 1997. Also information obtained about dental caries prevalence and severity in primary teeth (dmft/dmfs) by assessment decayed teeth/ surfaces, missing teeth/ surfaces due to caries and filling teeth/ surfaces according to Gruebbel 1944. Data collection started from 1/March to 20/April 2018. Data analyzed using statistics package for social science SPSS Inc, 2016 version 24 for windows and Excel 2007. Both "descriptive" and "interferential" statistics were used.

Interferential statistics: "statistical significant of mean differences between groups was analyzed using student t-test. Comparison was done with a 5% level of significance. P < 0.05 significant.

Results

The sample examined in this study was 436 schoolchildren aged 8-9 years in Wasit governorate. The mean value of dmft in control group was (3.42 ± 2.30), while in case groups (1,2,3,4) was (4.20±2.04), (4.92 ± 2.16), (6.22 ± 1.77), (6.50 ± 2.20) respectively (Figure 1).

![Figure 1. Mean values of dmft in control group and in case groups](image)

The mean value of dmft in case groups is higher than in control group, analysis of variance showed no significant differences between the mean value of dmft in control group and in case 1 group, while analysis of variance showed significant differences between the mean value of dmft in control group and in case 2, case 3 and case 4 groups (Table 1).

Table 1. the mean value of dmft in control group with the mean value of dmft in case groups (1,2,3,4).

<table>
<thead>
<tr>
<th>groups</th>
<th>Mean value of dmft</th>
<th>SD</th>
<th>DF</th>
<th>F</th>
<th>T-Test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.42</td>
<td>2.30</td>
<td>162</td>
<td>0.927</td>
<td>-1.083</td>
<td>0.285</td>
</tr>
<tr>
<td>Case 1</td>
<td>4.20</td>
<td>2.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.42</td>
<td>2.30</td>
<td>198</td>
<td>1.446</td>
<td>-2.359</td>
<td>0.02</td>
</tr>
<tr>
<td>Case 2</td>
<td>4.92</td>
<td>2.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.42</td>
<td>2.30</td>
<td>134</td>
<td>1.719</td>
<td>-3.465</td>
<td>0.002</td>
</tr>
<tr>
<td>Case 3</td>
<td>6.22</td>
<td>1.77</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3.42</td>
<td>2.30</td>
<td>246</td>
<td>0.183</td>
<td>-4.843</td>
<td>0.0001</td>
</tr>
<tr>
<td>Case 4</td>
<td>6.50</td>
<td>2.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The mean value of dmft of in total case groups was \((5.48 \pm 2.25)\), analysis of variance showed significant difference between the mean of dmft in control group and in total case groups (Table 2).

**Table 2. the mean value of dmft in control group with the mean value of dmft in total case groups.**

<table>
<thead>
<tr>
<th>dmft</th>
<th>Control group</th>
<th>Total case groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.42</td>
<td>5.48</td>
</tr>
<tr>
<td>SD±</td>
<td>2.30</td>
<td>2.25</td>
</tr>
<tr>
<td>DF</td>
<td>434</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>0.090</td>
<td></td>
</tr>
<tr>
<td>T - Test</td>
<td>-4.06</td>
<td></td>
</tr>
<tr>
<td>P- value</td>
<td>0.0001</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Highly significant</td>
<td></td>
</tr>
</tbody>
</table>

The mean value of dmfs in control group was \((0.09 \pm 0.07)\) while the mean value of dmfs in case groups \((1,2,3,4)\) was \((0.11 \pm 0.06), (0.16 \pm 0.14), (0.16 \pm 0.08), (0.17 \pm 0.09)\) respectively (Figure 2).

**Table 3. the mean value of dmfs in control group with the mean value of dmfs in case groups \((1,2,3,4)\).**

<table>
<thead>
<tr>
<th>groups</th>
<th>Mean value of dmfs</th>
<th>SD</th>
<th>DF</th>
<th>F</th>
<th>T-Test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>0.09</td>
<td>0.07</td>
<td>162</td>
<td>0.354</td>
<td>-0.764</td>
<td>0.45</td>
</tr>
<tr>
<td>Case 1</td>
<td>0.11</td>
<td>0.06</td>
<td>198</td>
<td>1.685</td>
<td>-2.225</td>
<td>0.03</td>
</tr>
<tr>
<td>Control</td>
<td>0.09</td>
<td>0.07</td>
<td>134</td>
<td>0.001</td>
<td>-2.566</td>
<td>0.01</td>
</tr>
<tr>
<td>Case 3</td>
<td>0.16</td>
<td>0.08</td>
<td>246</td>
<td>1.747</td>
<td>-3.205</td>
<td>0.002</td>
</tr>
</tbody>
</table>

The mean value of dmfs of in total case groups was \((0.15 \pm 0.1)\), analysis of variance showed significant difference between the mean of dmfs in control group and in total case groups (Table 4).
Table 4. the mean value of dmfs in control group with the mean value of dmfs in total case groups.

<table>
<thead>
<tr>
<th>dmfs</th>
<th>Control group</th>
<th>Total case groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.09</td>
<td>0.15</td>
</tr>
<tr>
<td>SD±</td>
<td>0.07</td>
<td>0.10</td>
</tr>
<tr>
<td>DF</td>
<td>434</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>T - Test</td>
<td>-2.786</td>
<td></td>
</tr>
<tr>
<td>P- value</td>
<td>0.001</td>
<td>significant</td>
</tr>
</tbody>
</table>

Discussions

First molar has an important role at individuals dental health among the known risk factors, the experience of previous caries is of the best predictors for future caries. In present study the mean value of dmft in control group was (3.42 ± 2.30) while in total case groups was(5.48 ± 2.25), caries development in the “permanent dentition” was indicating that children who had caries in their primary teeth this is in agreement with 10-14. Also in this study the mean value of dmfs in control group was (0.09 ± 0.07) while in total case groups was (0.15 ± 0.10) that means there was “linear correlation” between dmfs in primary teeth and DMFT of 1st permanent molars this in agreement with 1 but disagreement with 5, other risk factors of dental caries such as cariogenic diet, mothers educations was controlled. In present study the mean value of dmft and dmfs increased gradually with increasing DMFT scores of 1st permanent molars this in agreement with 5.

Conclusions

This study conclude that caries status in the “primary teeth” can be used as “a risk indicator” for predicting caries in the “permanent teeth”, and Caries prevalence and severity of primary teeth affects on the caries status of the permanent molars.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References

Molecular Diagnosis of some Virulence Genes in *Pseudomonas aeruginosa* Clinical Isolates in Wasit Province

Rawan Hassan Abdulaali Al-Saeedi¹, Rana Hussein Raheema¹

¹Department of Medical Microbiology, Faculty of Medicine, University of Wasit, Iraq

**Abstract**

*Pseudomonas aeruginosa* is an opportunistic pathogen and is a common cause of nosocomial infection, which causes a wide range of infection. Two hundred and seventy eight samples were collected from different hospitals and private clinics in Waist province during the period from 15th September 2017 to the 15th December 2017. Seventy one isolates were identification as *Pseudomonas aeruginosa* by culture characterized, biochemical tests, API20E. Sixty seven isolates were detected as *Peudomonas aeruginosa* by molecular methods of 16SrRNA gene. The polymerase chain reaction technique was used for screening, the (9) virulence genes (*opr L, opr I, tox A, lasB,phzS,exoS,phzM, phzH* and *nan1*), the result showed that 67(100%) isolates were PCR positive for *oprL* and *oprI*. The determined of *toxA* gene that PCR positive for 56(83.6%). Another gene *lasB* were 65(97%) PCR positive. *phzS* gene were 61(91%) PCR positive. The result of PCR showed that 50(74.6%) isolates were PCR positive for *exoS* gene. The *phzM* gene in sixty seven isolates of *Pseudomonas aeruginosa* give PCR positive result in 36(53.7%). Results of *phzH* gene in *Pseudomonas aeruginosa* 32(47.8%). The *nan1* gene detected in 67 isolates of *Pseudomonas aeruginosa* and percentage of PCR positive were 48(71.6%). In conclusion, in studied the samples, still wounds are the common sites for *Pseudomonas aeruginosa* followed by ear and urine. 16SrRNA based PCR assay is highly accurate and reliable for identification of *Pseudomonas aeruginosa*.

**Keywords:** *Pseudomonas aeruginosa*, virulence genes, multiplex PCR

**Introduction**

Nosocomial infections or healthcare associated infections occur in patients under medical care. These infections occur during hospital stay, they cause prolonged stay, disability, and economic burden, during hospitalization, patient is exposed to pathogens through different sources environment, healthcare staff, and other infected patients, and also hospital waste serves as potential source of pathogens¹. *Pseudomonas aeruginosa* is a common cause of nosocomial infections². in individuals who are immune compromised, such as UTI, respiratory system infections, dermatitis, soft tissue infections, bacteremia, bone, joint infections, GI and a variety of systemic infections³. A major clinical problem caused by *Pseudomonas aeruginosa* is burn, lung infection in patients with cystic fibrosis and is the leading cause of fatality rate in these patients is around 50 percent⁴.

It possesses a various virulence factors which contribute to the bacterial invasion and toxicity⁵, such as las B elastase, encoded by the *las B* gene⁶. *nan1* gene encoding neuraminidase helps bacteria to adhere to epithelial cells⁷. Exoenzyme S encoded by the *exo* assist *Pseudomonas aeruginosa* to keep away from phagocytosis and in the end murder the host cell⁸. Exotoxin A encoded by the *toxA* gene, inhibit protein synthesis of the host cells⁹. Also, synthesizes phenazines that consider redox-active that are toxic to human cell¹⁰. There are also two outer membrane genes that help to rapidly diagnose of *Pseudomonas aeruginosa* oprL and oprI gene¹¹,¹². This study aimed to assess the 16SrRNA and nine virulence factor genes (*oprI /oprL /lasB / toxA /exoS /nan1 /phzS /phzM /phzH*) in *Pseudomonas aeruginosa* isolates.

**DOI Numbers: 10.5958/0976-5506.2019.00789.7**
Materials and Method

Sampling

A total of 278 samples were collected from different site (wound, ear, sputum, seminal fluid, CSF, stool, and urina) of patients in the hospital and private clinics in Wasit province.

Identification of *Pseudomonas aeruginosa*

The collected sample (278) was cultured on blood agar, MacConkey agar, Cetrimide agar, and incubated at 37°C for 24 hours. The isolated bacteria were identified according to colonial morphologies and biochemical tests. Then identification by API E test.

Extraction of genomic DNA

The DNA of isolates of *Pseudomonas aeruginosa* was extracted according to the instruction of Presto Mini g DNA bacteria Kits (Geneaid, Thailand).

Detection of gene and PCR protocols technique

PCR technique was used for amplifying 16SrRNA and *nan1* gene. The mixture reaction was performed in a total volume 20µl of PCR Pre Mix (Bioneer, South Korea) consisting of 1µl from each primer forward and reverse, 3µl of DNA and, the volume completed up to 20µl with free nucleases deionized water according to the instructions of the company. Detection of *(oprL, oprI, toxA, exoS, lasB, phzS, phzM, phzH)* gene were carried out by using a 20µl master mix of Gold Multiplex PCR (Bioneer, South Korea) including 1µl DNA, 1µl from each primer forward and reverse, and the volume was completed up to 20µl with free nucleases deionized water according to the instructions of the company. Table (1) shows the list of primer that using to identification *Pseudomonas aeruginosa* and detection of virulence gene.

Table 1. Sequences of primers used for detection of *Pseudomonas aeruginosa*

<table>
<thead>
<tr>
<th>No</th>
<th>Genes</th>
<th>Sequence (5’-3’)</th>
<th>Size (bp)</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>16SrRNA</td>
<td>F:5’-AGGGAGCTTGCCCTTGAATTTC-3’  R:5’-TTTACCTTGGCCGTACT-3’</td>
<td>826</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>oprI</td>
<td>F:5’-ATGAAACAGCTTTGAAATTCTCTGCT-3’  R:5’-CTTGCGGTGGCCTTTTCCAG-3’</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>oprL</td>
<td>F:5’-ATG GAA ATG CTG AAA TTC GGC-3’  R:5’-CTTCTTCCAGCTCGACGACG-3’</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>lasB</td>
<td>F:5’-GGGAATGAACAGGGTCTTCC-3’  R:5’-GGGTCCAGATGATGATCGGTGG-3’</td>
<td>300</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>toxA</td>
<td>F:5’-GGTAACCAGCTCGACACAT-3’  R:5’-TGATGTTCAGTCGTGCTC-3’</td>
<td>352</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>exoS</td>
<td>F:5’-CTTGAAGGGACTCGACAGC-3’  R:5’-TTCAGGTGGCTAGTGATAT-3’</td>
<td>504</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>nan1</td>
<td>F:5’-CTACAGGCGGAAACACCAT-3’  R:5’-CGGACGCCGCCGCCGCCACACATAC-3’</td>
<td>484</td>
<td>This study</td>
</tr>
<tr>
<td>8</td>
<td>phzM</td>
<td>F:5’-ACGATCATGCGGTGTCAT-3’  R:5’-GCCGATTTGACCAAGCCG-3’</td>
<td>454</td>
<td>16</td>
</tr>
<tr>
<td>9</td>
<td>phzS</td>
<td>F:5’-TCGACGCTGCATTACGCAT-3’  R:5’-ACAACTGAGCCAGCCTTCC-3’</td>
<td>1752</td>
<td>17</td>
</tr>
<tr>
<td>10</td>
<td>phzH</td>
<td>F:5’-GGGTGGGTGGATACAC-3’  R:5’-CTCACCAGTGGTTGAGAG-3’</td>
<td>1752</td>
<td></td>
</tr>
</tbody>
</table>
PCR program thermal controller

PCR cycling program parameters used in this reaction for detection of genes were shown in table (2).

Table 2. Thermal cycling program for all gene.

<table>
<thead>
<tr>
<th>Target gene</th>
<th>Initial denaturation (1) cycle</th>
<th>Amplification (35) cycles</th>
<th>Final extension (1) cycle</th>
<th>infinity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Denaturation</td>
<td>Annealing</td>
<td>Extention</td>
<td></td>
</tr>
<tr>
<td>16srRNA</td>
<td>95°C/5min</td>
<td>95°C/30sec</td>
<td>58°C/30sec</td>
<td>72°C/30sec</td>
</tr>
<tr>
<td>nan1</td>
<td>95°C/5min</td>
<td>94°C/20sec</td>
<td>58°C/20sec</td>
<td>72°C/30sec</td>
</tr>
<tr>
<td>oprL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>oprI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lasB</td>
<td>95°C/5min</td>
<td>94°C/30sec</td>
<td>58°C/30sec</td>
<td>72°C/1min</td>
</tr>
<tr>
<td>toxA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>phzS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>exoS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PhzM</td>
<td>95°C/5min</td>
<td>94°C/30sec</td>
<td>60°C/30sec</td>
<td>72°C/1min</td>
</tr>
<tr>
<td>PhzH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Statistical Analysis

The statistical analysis of all the evidence was done using the system SPSS IBM version 20 software, Chi-squire test. P-value ≤ 0.001 was considered statistically significant.

Results and Discussion

Collection of sample

Total 278 clinical samples were collected in this study which include wound (n=80), ear (n=71), UTI (n=55), burn (n=23), stool (n=18), throat (n=15), sputum (n=14), seminal fluid (n=1) and C.S.F (n=1).

Identification of *pseudomonas aeruginosa*

Seventy one pure bacterial isolated were obtained from 278 clinical samples. These isolates were identified according to culture characteristics of isolate on different media (Table-3). All isolates were gram negative, rod shape, coliform under the microscope examination as described previously by Holt *et al.* then biochemical tests(Table4), API 20E system identification kits and confirmed by 16SrRNA.
Table 3. Pseudomonas aeruginosa on Cultural Characteristics.

<table>
<thead>
<tr>
<th>Culture media</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood agar</td>
<td>white to gray color colonies, sticky textures bacteria and showed type of beta hemolysis.</td>
</tr>
<tr>
<td>MacConkey agar</td>
<td>small pale pink colonies non lactose fermenting.</td>
</tr>
<tr>
<td>Cetrimide agar</td>
<td>which appear mucoid, smooth in shape with flat edges and elevated center, fruity odor and fluorescent green and creamy pigment.</td>
</tr>
</tbody>
</table>

Table 4. Biochemical test used for identification of Pseudomonas aeruginosa.

<table>
<thead>
<tr>
<th>Biochemical test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidase test, Catalase test</td>
<td>Positive</td>
</tr>
<tr>
<td>IMVC</td>
<td>(-,-,-,+ )</td>
</tr>
<tr>
<td>Urease test</td>
<td>Negative</td>
</tr>
<tr>
<td>Motility test</td>
<td>Positive</td>
</tr>
<tr>
<td>Triple Sugar Iron (TSI)</td>
<td>Alkaline / no change with no produce H₂S and gas</td>
</tr>
</tbody>
</table>

All 71 isolates of Pseudomonas aeruginosa gave the same result by using API20E diagnostic kit. According to this study, 71(25.53%) of Pseudomonas aeruginosa were isolated from different clinical samples, Similar results were recorded by Hassan in Kurdistan who obtain (26%) isolates from different clinical source.

Highest percentage of Pseudomonas aeruginosa infections was observed in wound infection 24(33.8%), this bacterium can be considered the major agents of nosocomial infections in wound followed by ear infection and the frequency of Pseudomonas aeruginosa was 19(26.8%), then UTI 12(16.9%). While in throat was 5 (7%), burn 4 (5.6%), sputum 3(4.2%), stool 2(2.8%) seminal fluid and C.S.F 1(1.4%) for both. These results came in accordance to results obtained by Hassan, 2012 in Kurdistan, which showed percentage of Pseudomonas aeruginosa isolated from burn (10.9%).

Other study in Iraq by Ahmad, show similarity with this study that revealed the percentage of Pseudomonas aeruginosa isolated from wound, UTI and ear were 32%, 27% and 17% respectively except burn was(24%). In this study, the percentage of the source of infection is a reflection of the actual reality of pseudomonas aeruginosa in hospitals, but the differences in these ratios for other studies may be due to non-sampling regularly or other factors such as contamination. Further tests were conducted to confirm the identification by using 16SrRNA after diagnosis of bacteria by biochemical test and API20E. DNA of 71 isolated were extracted and conventional PCR was performed to amplify gene, and 67 isolated were identified as Pseudomonas aeruginosa. The results showed that 16SrRNA is a more accurate method for the detection of Pseudomonas aeruginosa than biochemical methods this was concurred with the result of Marhoon, Abdulammer.

DNA Extraction

The DNA extraction of 71 isolates was extracted; purity and concentration were confirmed with Nanodrop. The purity of Pseudomonas aeruginosa isolated (1.7-2),
and the concentration was between 50-360 ng/µl. The purity DNA is a good indicator of the extraction process as well as confirming the absence of impurities that could impede the process 24.

DNA samples were taken from different sources and using an electrophoresis relay device, the results were seen using transillumintor UV light as shown in (Figure 1). Gel electrophoresis is used to determine of extracted DNA fragments 25.

Figure 1. Gel electrophoresis of genomic DNA with loading dye, from Pseudomonas aeruginosa.

**Polymerase chain reaction for Identification of Pseudomonas aeruginosa**

From 71 isolate, 67(94.36%) were positive for the 16SrRNA and identified as Pseudomonas asaeruginosa, as show in figure (2).

Figure 2. Gel electrophoresis of Pseudomonas aeruginosa16SrRNA. Lane (M): DNA ladder(100-3000bp), Lanes (1,12): sample from different site.

**Detection of the Pseudomonas aeruginosa Virulence Genes**

The detection of virulence gene (opr L, opr I, tox A, lasB, phzS, exoS, phzM, phzHand nan1) by using PCRfor 67 isolated of Pseudomonas aeruginosa. The result of PCR revealed (100%) were positive for opr L gene as shown in Figure (4).These result agree with Al-Mayyahi, 26 was showed (100%) of isolated harbored of this gene. The oprI gene dissemination showed (100%) isolates were PCR positive as shown in Figure (4). These results came in according with Al-Mayyahi; 26 in Iraq.

The detection toxA gene by PCR revealed positive percentage were 56(83.6%), as shown in Figure (3). In a similar study done in Baghdad by Ahmad,21 report a rate of toxA as (80%). The percentage of lasB gene show PCR-positive were 65 (97%).As shown in Figure (3). These result came in according with thses obtained by Ra’oof,27 in Tikrit (100%). The percentage the phzS gene 61(91%) PCR-positive. As shown in Figure (4). Our result, disagrees with the finding of previous study by Fazeli et al.28 who obtain (19.6%) isolated harbored this gene.
Figure 3. Gel electrophoresis of amplified for *Pseudomonas aeruginosa* (opr L, opr I, tox A, lasB, phzS) gene. Lane (M): DNA ladder (100-3000bp), Lanes (1,12): sample from different site.

The result of PCR showed 50 (74.6%) were PCR positive for exoS gene, as shown in Figure (4). A study by Azimi, in Iran which (26.3%) contain this gene. The result of PCR of (phzM) gene show 36 (53.7%). As shown in Figure (5). Globally, the percentage of phzM in Iran Fazeli *et al.* was (36.27). The result of this study showed 32 (47.8%) had phzH gene, as shown in Figure (4). Similarly Fazeli *et al.* noted that 20.8% were positive for this gene.

Figure 4. Gel electrophoresis of amplified for *Pseudomonas aeruginosa* (exoS, phzM, phzH, ) gene. Lane (M): DNA ladder (100-3000bp), Lanes (1,12): sample from different site.

The nan1 gene detected in 67 isolates of *Pseudomonas aeruginosa* and the percentage of PCR-positive were 48 (71.6%), as shown in Figure (5). Nearly, similar results were recorded by Wolska, which showed that the (83.9%) were positive for this gene.

Figure 5. Gel electrophoresis of amplified for *Pseudomonas aeruginosa nan1* gene. Lane (M): DNA ladder (100-3000bp), Lanes (1,12): sample from different site.

Differences in the distribution of virulence genes in the world may be owing to; some strains of *Pseudomonas aeruginosa* are characterized by their ability to adapt to infection areas while taking advantage of the conditions of that sites. It may also be because isolates of patients have different clinical and physiological conditions. Conclusions, still wounds are the common sites for *Pseudomonas aeruginosa* followed by ear and urine, also using 16SrRNA-based PCR assay is highly specific, sensitive and reliable for identification of *Pseudomonas*
aeruginosa and its differentiation from other closely related Pseudomonas species.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


17. Fazeli, N. and Moomzat, H. Virulence Gene Profiles of Multidrug-Resistant Pseudomonas aeruginosa Isolated From Iranian Hospital Infections. *Iran Red


Persistently Elevated Levels of Serum Autoimmune Inflammatory Markers after Total Thyroidectomy for Hashimoto’s Thyroiditis An Indicator of Prevailing Autoimmunity

Adil Shaker Al-Tamimi¹, Israa A Dheeb²

¹Department of Surgery, College of Medicine, University of Al-Qadisiyah, Iraq, ²Department of Medical Microbiology, College of Medicine, University of Al-Qadisiyah, Diwaniyah, Iraq

Abstract

Hashimoto’s thyroiditis characterized by glandular lymphocytic infiltration with progressive parenchyma destruction and fibrosis. The autoimmunity was suggested by the reduced immune tolerance and the production of antibodies. The description of Th17 subpopulation has undesirable role in the pathogenesis of Hashimoto’s disease. Among the cytokine secretion of Th17 is cell-type specific which carry its major effectors functions, IL17 and IL 22 are the most important.

Fifty two drug native patients with Hashimoto’s thyroiditis were enrolled in the study. Preoperative, 6 weeks and 6 months postoperative serum assay of ATPO Ab, IL6, tumor necrosis factor TNF-α, IL17 A, IL22,IL23 was adopted. Surgery in form of total thyriodectomy was carried out for patients with suspicious nodule based on cytological examination or large symptomatic multinodular goiter.

The preoperative elevated Anti TPO Ab significantly higher levels than the 6 weeks and 6 months post operative measurement. Serum levels of IL 6 and TNF-α were significantly higher in the preoperative measurement than the 6 weeks post operative measurement, and higher than 6 months serum level for IL6 but not TNF –α. The IL 17A levels were significantly higher in the preoperative patients sera than the 6 wk post operative measurement, but not the 6 months measurement. No statistical difference was observed in the preoperative and post operative levels of IL 22. The preoperative serum Level of IL-23 was apparently high, and significantly different from 6 weeks and 6 months post operative measurement.

The measured selected immune parameters exhibit partial decrease in serum level which would not reach the normal circulatory levels 6 months after thyroidectomy.

Keywords: Autoimmunity, Thyroidectomy, Inflammatory Markers.

Introduction

Hashimoto’s thyroiditis (HT) is common autoimmune thyroid disorders with glandular lymphocytic infiltration with progressive parenchyma destruction and fibrosis. HT affects 3–4% HT of the general population. The disease is 10 times more frequent in females than males. The exact etiology of the disease is still elusive however genetic and environmental factors influence the development of autoimmunity against thyroid tissue. The autoimmunity was suggested by the reduced immune tolerance and the production of antibodies. The majority of patients have raised anti-thyroid peroxidase (anti-TPO). As destruction of thyrocytes progress followed by loss of thyroid hormone synthesis and eventual hypothyroidism. Cell mediated autoimmune response is the main although not the sole pathogenic finding in HT, this response arise from a disruption of self-tolerance to thyroid antigenic structure. In HT Th1 (T helper) lymphocytes generate an intense inflammatory infiltrate (predominantly lymphocytic) of thyroid gland, which initiate further thyroiditis and loss of thyrocytes. The activated cytotoxic lymphocytes...
and macrophages, directly attack and destroy the thyroid follicular cells\textsuperscript{11}. The suggested accelerated apoptosis seen in HT is thought to be induced, when thyrocytes express molecules involved in cell cycle and apoptosis (Fas receptor and also Fas ligand), a process mediated by cytokine released from Th1 and macrophage\textsuperscript{12}. Th2 also induce B lymphocytes and plasma cells to produce thyroid targeted antibodies\textsuperscript{13}. In fact, although the cell-driven destruction of thyrocytes is the main pathological finding, antibodies to TPO and Tg are also important components. Th1 cytokines stimulate the release of immunoglobulin (Ig) G1, whereas Th2 cytokines participate in production of IgG4\textsuperscript{14,15}. TPO and Tg auto antibodies are of both IgG4 and IgG1 subclasses, indicating participation of Th2 and Th1 cytokines, including IL6 and TNF alpha\textsuperscript{16}. The Th1 mediated disease is the most widely accepted, however the concept is further modulated by the description of Th17 subpopulation\textsuperscript{17}. The Th17 cells mediate both normal and pathological immune response by its major role in immune response to the confounding extracellular pathogens and the disadvantageous role in the pathogenesis of several autoimmune diseases\textsuperscript{18}. The cytokine secretion of Th17 is cell-type specific which carry its major effectors functions, among which IL17 and IL 22 are the most important. Moreover, the Th17 cell expansion and survival is mainly mediated by IL-23\textsuperscript{19}. The clinicopathological course of the disease is very variable ranging from subclinical state to overt thyroid failure\textsuperscript{20}. Clinically HT present early with transient subclinical or overt hyperthyroidism for a variable periods followed by a stationary phase of euthyroid state eventually culminating on hypothyroidism, all stages of the disease may or not associated with goiter\textsuperscript{21}.

**Aim** : To evaluate some immune parameters in the sera of selected patients with Hashimoto’s thyroiditis before and after total thyroidectomy.

**Materials and Method**

Fifty two patients with presumptive diagnosis of Hashimoto’s thyroiditis were included in the study. The preoperative diagnosis was based upon clinical features, raised serum thyroid peroxidase Ab, cytology, TSH, thyroid hormone estimation and thyroid ultrasound. All patients were drug native euthyroid or mildly hypothyroid. Blood samples were collected in three different occasions, preoperatively as part of the assessment, 6wk and 6 months post operatively as part of the follow up, serum obtained for assay of ATPO Ab, IL6, tumor necrosis factor TNF-\textalpha, IL17 A, IL22, IL23. The indications for surgery was Hashimoto’s thyroiditis with suspicious nodule based on cytological examination or large symptomatic multinodular goiter. Surgery in form of total thyroidectomy was successful in all patients and was followed by full Levo-thyroxin replacement. All resected specimens were subjected to histopathological examination which proved the diagnosis of Hashimoto’s disease.

**Inclusion criteria**

Adults patients (18-60 years) with recent diagnosis of Hashimotos thyroiditis with euthyroid or subclinical hypothyroid state who were not subjected to any form of thyroid hormone replacement therapy.

**Exclusion criteria**

1. Patients with malignant disease including patients in whom thyroid malignancy was discovered after thyroidectomy.
2. Patients on thyroxin replacement.
3. Patients with advanced hypothyroidism.
5. Patients with chronic or autoimmune disease other than HT.
6. Patients on chronic steroid or immunosupresive drugs.

All candidates informed about the details of the research including the hazards of surgery and the planned follow up, for which they signed a written consent. Levels of antithyroid peroxidase (anti-TPO) antibodies in the sera of all candidates was determined, using the diagnostic enzyme-linked immunosorbent assay (ELISA) kit (Monobind Inc., Lake Forest, USA). Values more than 40 IU/ml were considered positive.

IL-6 ,TNF-\textalpha ,IL-17A, IL-22, and IL-23 serum measurements were detected using human ELISA kit in accordance to the manufacturer’s instructions (KOMABIOTECH- INC. Korea).

**Statistical analysis**

\textit{t}-test for Independent sample was used for comparing the means of the two groups.
**Results**

**Table 1. Age and Gender characteristics**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age in years</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>minimum</td>
<td>maximum</td>
<td></td>
</tr>
<tr>
<td>Female (n=44)</td>
<td>43.3</td>
<td>8.8</td>
<td>27</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Male (n=8)</td>
<td>36.25</td>
<td>5.28</td>
<td>26</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Total (n=52)</td>
<td>42.2</td>
<td>8.7</td>
<td>26</td>
<td>61</td>
<td></td>
</tr>
</tbody>
</table>

The preoperative elevated Anti TPO Ab showed higher levels than the 6 weeks and 6 months post operative measurement p value 0.001 and 0.0001 respectively. The 6 weeks serum level of anti TPO Ab was significantly higher than the 6 months measurement p value 0.0001. Serum levels of IL 6 were significantly higher in the preoperative measurement than the 6 wk and 6 months post-operative measurement p value 0.01 and 0.003 respectively. Furthermore, no statistical difference was found between the 6 wks and the 6 months post operative measurement. The serum level of TNF-α in the preoperative measurement was significantly higher than the 6 wk post operative measurement p value 0.02 but no significant difference was found between the preoperative and 6 months measurement. The IL 17A levels were significantly higher in the preoperative patients sera than the 6 wk post operative measurement P value 0.04, but not the 6 months measurement. Furthermore no significant difference found between the 6 weeks and 6 months measurements. No statistical difference was observed in the preoperative and post operative levels of IL 22. The preoperative serum Level of IL-23 was apparently high, and significantly different from 6 weeks and 6 months post operative measurement p value =0.0001. No difference was found in serum level between the 6 weeks and 6 months measurements (Table 2).

**Table 2. The pre and postoperative measured parameters, expressed by mean ±SD.**

<table>
<thead>
<tr>
<th>parameter</th>
<th>Preoperative</th>
<th>6 wk</th>
<th>6 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-TPO( Iu/ml)</td>
<td>708.3±194.4</td>
<td>317.9±154.1</td>
<td>180.4±90</td>
</tr>
<tr>
<td>IL 6(pg/ml)</td>
<td>93 ± 12.18</td>
<td>30.3±9.05</td>
<td>21.2±9.9</td>
</tr>
<tr>
<td>TNF-α (pg/ml)</td>
<td>29.7 ± 14.2</td>
<td>19.03±10.8</td>
<td>23.6±13.45</td>
</tr>
<tr>
<td>IL 17 A(pg/ml)</td>
<td>7.8±5.7</td>
<td>5.7 ± 3.64</td>
<td>6.7±4.4</td>
</tr>
<tr>
<td>IL22(pg/ml)</td>
<td>30.9±16.2</td>
<td>28.8±20.1</td>
<td>27.5±17.3</td>
</tr>
<tr>
<td>IL23(pg/ml)</td>
<td>87.76±11.7</td>
<td>45.9±9.8</td>
<td>42.3±7.9</td>
</tr>
</tbody>
</table>

**Discussion**

In 2003 the discovery of Th17 cells, a unique CD4+ T-cells sub population have been found to have both beneficial and harmful immunological function, especially as a result of extravagant Th1 responses. These lymphocytes are the major source for production of cytokines from IL-17 family namely the IL17A and IL17 F, together with IL21 and IL22, which particularly accentuate the immune state by further release of other pro inflammatory cytokines like IL-Beta, TNF-α, and chemokines which are involved in cellular induced tissue damage. The IL-17A is the well known form in this family and has established proinflammatory effect in HT. Many cytokines have been suggested to have a potential role in the Th17 cells differentiation in humans among which the IL23, IL21, IL6 and TNF-α are the most important players. It has been found that patients suffering from HT found to have abnormally raised levels of Th17 cells and Th-17 related pro inflammatory cytokines. Our findings was supportive of the persistently high serum level of ATPO antibody following total surgical thyroid ablation.

The pro inflammatory IL6 and TNF alpha has been found to have crucial role in the pathogenesis of HT, most of the published data agreed with the finding of increases serum level in patients with HT irrespective to the clinical state. To date no available data regarding the serum level of these proinflammatory cytokines in thyroidectomised patients with HT. Yet no available research has depict the changes in the IL17 serum level in
patients with HT after thyroidectomy. IL22 has a potential role in autoimmune disorders including HT, through its ability to induce other pro inflammatory cytokines[30]. Our results are associated with only modest increased serum level of IL-22 in HT patients preoperatively, results which has been demonstrated by[31]. Moreover our results declared no difference in serum level of IL-22 results between pre and post operative measurement in our sample. IL-23 is known to have potent stimulatory effect on Th-1 to differentiate, producing the Th-17 subpopulation. Ruggeri et al has recorded a significant increase in serum level as compared with healthy control[32], While results displayed by Fatemeh et al declare a non significant difference in serum level of IL-23 between patients with HT and healthy control[31]. Our data revealed an abnormally high serum levels of IL-23 in the pre operative measurement which was statistically different from the post operative one, in which the levels approximately halved and remained static in an abnormally higher level for the following 6 months period. These parameters are indicative that the immune process is still working in spite of removal of the thyroid gland. The mechanisms, by which the auto reactive T cells escape deletion earlier and subsequent anergy, and activated thereafter remain elusive. Furthermore it has been found that patients with HT have elevated levels of Th-17 and its associated pro inflammatory cytokines both in the thyroid and peripheral blood[27]. The natural T regulatory cells regarded by many as the natural suppressor of T reactive cells and responsible for maintaining the peripheral tolerance[33], In HT they found to be dysfunctional and loss their immunosuppressive function and in the affected patients, and possibly converted to a pro inflammatory cells (Th- 1 and Th-17)[34]. On the other hand the coexistence of HT and other autoimmune diseases like diabetes and Addison disease and the existence of autoimmune polyendocrine syndrome type II, supplement the involvement of generalized autoimmune process rather than isolated thyroid targeted autoimmunity[35]. Moreover the development of Hashimotos related encephalopathy which has immunologically based pathogenesis, may uncover the prevailing autoimmunity[36].

**Conclusion**

The level of selected circulating immune parameters which was essentially elevated before thyroidectomy in patients with Hashimoto’s thyroiditis, exhibit only partial reduction after total surgical removal of the gland. Therefore, in autoimmune disease extirpation of the target organ will not ablate the autoimmunity in particular patient.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


16. Rapoport B, McLachlan SM. Graves’ hyperthyroidism is antibody-mediated but is predominantly a Th1-type cytokine disease. J Clin Endocrinol Metab. 2014; 99:4060–1


Depression among Islamic School (Madrasah) Students in Marang and Setiu District, Terengganu

Ain Syahada H.1, Siti Hajar A. R1
1Lecturer, Faculty of Applied Social Sciences, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Terengganu, Malaysia

Abstract

DASS stand for the Depression, Anxiety, and Stress Scale. The DASS questionnaire is a set of three self-report scales designed in order to measure the negative emotional states of depression, anxiety, and stress. The main objective of this study is to determine the depression’s level between male and female students in Madrasahs selected in Marang and Setiu district, Terengganu. The research instrument used to collect data are 448 sets of DASS questionnaire. The participants in this study consist of 448 respondents (177 male, 271 female) regardless of their status either an orphan or non-orphan. The analysis used was Analysis of Variance (ANOVA) and Chi-Square test. There are 7 questions (items) about depression in DASS. The validity of the items tested by using ANOVA and it shows a high validity and reliable to use in this study. Results from the chi-square test show that gender does affect the level of depression with the value of $p = 0.001$ which are smaller than the value of $\alpha = 0.05$. In this research, it shows that gender does affect the level of depression between male and female respondents. Hence, a precaution steps need to be taken in order to avoid any unwanted accidents.

Keywords: DASS, Depression, Mental health, Madrasah, Islamic school

Introduction

Mental health is a person’s condition with regard to their psychological and emotional well-being where all this pressure seems to be affecting individual mental health. According to the USA1, emotional, psychological, and social well-being included as a mental health. All those things do affects how we think, act, and feel. World Health Organization (WHO)2 defined mental health as a state of well-being in which every individual realizes their own potential. Depression, Anxiety, and Stress Scale (DASS) questionnaire3. The DASS questionnaire was modified and shortened and eventually it contained 21 items from its original version.

Depression is defined as a state of intense sadness or despair that has progressed to a level that is troublesome to an individual’s social functioning and the basic activities of daily living. Common feelings of depression are not limited to irritability, fatigue, apathy, and sadness but it can be included. When these feelings become stronger and more consistent, substance abuse and risky sexual behavior tend to become outlets for young adults who experience frequent low feelings4.

In daily use, the “depression” word referred to sad feelings experienced by an individual5. Based on6, depression can be regarded as a feeling, a syndrome or a clinical disease. The main objective of this study is to determine whether there are significant differences in depression level between male and female students in Islamic School (Madrasah) selected in Marang and Setiu district based on the Depression, Anxiety, and Stress Scale (DASS) questionnaire.

Methodology

Participants: Participants of this study consist of 66 respondents in the Madrasah Ad-Diniah Al-Islamiah in the Setiu district. While 151 respondents were selected in the Ma’ahad Darul Quran and 231 respondents were selected in Madrasah Mazahirul Ulum where both
Madrasahs were in Marang district. The total number of participants selected was 448 respondents (177 male, 271 female).

**Mental Test:** The DASS questionnaire containing 21 items was adapted and translated to Malay for the Malaysians’ use where the Cronbach Alpha value is 0.947. Each of the DASS questionnaires consists of 7 questions. The DASS questionnaire used a Four-Point Likert-Scale, where the scoring range is between 1 to 4. Scoring scale 1 illustrates the statements that do not reflect and describe the respondent’s self-condition (never at all). The scoring scale 2 represents a few or fewer statements that describe the respondent’s self-condition (rarely). Scoring scale 3 then illustrates many statements, always or often reflects the respondent’s self-condition (frequent). While for scoring scale 4, they represent various statements or very often statements that describe the respondent’s self-condition or situation (very often). The depression, anxiety, and stress scores are calculated by summing the scores for the relevant items.

**Analysis of Variance (ANOVA):** Analysis of Variance (ANOVA) is a collection of statistical models and their associated estimation procedures such as the variation among and between groups that are used in order to analyze the differences among group means in a sample. ANOVA was developed by statistician and evolutionary biologist. The observed variance in a particular variable is partitioned into components attributable to different sources of variation in the ANOVA setting. The items of the questionnaire divided into 7 part and all of them added as variables. All the results have shown p ≤ 0.05 alpha level of confidence. The ANOVA test was done using XLSTAT Statistical Software.

**Chi-Square Test:** A Chi-Square test found by Karl Pearson in his 1900 paper. A Chi-Square Test which also written as a χ² test is any statistical hypothesis test where the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Chi-squared test is short for Pearson’s chi-squared test. The test is used in order to determine whether there is a significant difference between the expected frequencies and the observed frequencies in one or more categories or not. To analyze the frequencies of the Islamic School (Madrasah), Chi-squared test was run in Statistical Package for Social Science (SPSS) version 20.0.

---

**Results and Analysis**

The Depression, Anxiety, and Stress Scale (DASS) items or questionnaire’s sub-scale. The test results show Pr > F values of all sub-scale or items where the result is < 0.0001 and having a high validity and valid to be used in the study. So, it is significant because the value is smaller than 0.05. The validity of questionnaire items is significant and can be used. The test results are as shown in Table 1. The reliability of the sub-scale level of depression was high and appropriate for the purpose of measuring the level of depression among male and female respondents (students) selected Madrasah in Marang and Setiu district, Terengganu. It shows that the sub-scale of depression level has a high-reliability value because it achieves Alpha Cronbach coefficient value which is 0.5 and above. The findings of the study show the Alpha Cronbach coefficient for the reliability of the scale of depression level reaches the value of α = 0.947. Table 2 shows the frequency table of distribution and percentage of respondents by gender involved in this study in Madrasah Ad-Diniah Al-Islamiah, Langkap in Setiu district. Based on the tables shown below, it shows that the total of male respondents is 64 respondents (97 percent). While, the total of female respondents is 2 respondents (3 percent). The total of male and female respondents combined are 66 respondents (100 percent). Based on the tables shown below, it shows that the total of female respondents is 231 respondents (100 percent).

**Table 1: The Validity Value of the Sub-Scale of the Questionnaire Items**

<table>
<thead>
<tr>
<th>Sub-Scale of Depression Level</th>
<th>No. of Item</th>
<th>Pr &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to become interested or involved</td>
<td>3</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Slow, lacking in initiative</td>
<td>5</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Pessimistic about the future</td>
<td>10</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Dispirited, gloomy, blue</td>
<td>13</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Unable to experience enjoyment or satisfaction</td>
<td>16</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Self-disparaging</td>
<td>17</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Convinced that life has no meaning or value</td>
<td>21</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>
Table 2: Distribution of Respondents by Gender in Madrasah Ad-Diniah Al-Islamiah

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent (%)</th>
<th>Valid Percent (%)</th>
<th>Cumulative Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>64</td>
<td>97</td>
<td>97</td>
<td>97</td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the frequency table of distribution and percentage of respondents by gender involved in this study in Madrasah Mazahirul Ulum in Marang district. Based on the tables shown below, it shows that the total of male respondents is 113 respondents (74.8 percent). While, the total of female respondents is 38 respondents (25.2 percent). The total of male and female respondents combined are 151 respondents (100 percent). As the Table 4 shows below, by combining both male and female respondents in all three Madrasah, 287 (64.10 percent) respondents have a normal scale of depression which is they are not having a depression. A total of 92 (20.50 percent) respondents are having a mild depression and 33 (7.40 percent) respondents are having a moderate depression. 23 (5.10 percent) respondents are suffering a severe depression. There are 13 (2.90 percent) respondents are suffering an extremely severe depression. There are 448 (100 percent) respondents in total who are going through a various scale of depression. Based on Table 5 it is found that the value of \( p = 0.01 \), which is smaller than the value of \( \alpha = 0.05 \), then the research question is answered. This means there is a significant difference between male depression and female depression. As the result of the test shows that there is a significant difference, it can be concluded that gender does affect the scale of depression among male and female respondents in Islamic School (Madrasah) selected in this study both in Marang and Setiu district.

Table 3: Distribution of Respondents by Gender in Madrasah Mazahirul Ulum

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent (%)</th>
<th>Valid Percent (%)</th>
<th>Cumulative Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>113</td>
<td>74.8</td>
<td>74.8</td>
<td>74.8</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>25.2</td>
<td>25.2</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>151</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Scale of Depression Cross Tabulation

<table>
<thead>
<tr>
<th>Scale of Depression</th>
<th>Normal</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Extremely Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Count</td>
<td>134</td>
<td>28</td>
<td>6</td>
<td>5</td>
<td>177</td>
</tr>
<tr>
<td>% within Gender</td>
<td>75.70%</td>
<td>15.80%</td>
<td>3.40%</td>
<td>2.80%</td>
<td>2.30%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Female</td>
<td>Count</td>
<td>153</td>
<td>64</td>
<td>27</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>% within Gender</td>
<td>56.50%</td>
<td>23.60%</td>
<td>10.00%</td>
<td>6.60%</td>
<td>3.30%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>287</td>
<td>92</td>
<td>33</td>
<td>23</td>
<td>13</td>
</tr>
<tr>
<td>% within Gender</td>
<td>64.10%</td>
<td>20.50%</td>
<td>7.40%</td>
<td>5.10%</td>
<td>2.90%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
Table 5: Chi-Square Test

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-Sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>19.097a</td>
<td>4</td>
<td>0.001</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>20.087</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>13.81</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>448</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the level of confidence = 0.05 (2-sided)

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 5.14.

**Discussion**

Scale of depression cross tabulation by gender below shows the count and percentage within gender in all 3 Islamic School (Madrasah) in Marang and Setiu district. The scale of depression of male respondents in all 3 Madrasah when combined shown a result of respondents who are not suffering any depression by means that they are scoring up a normal scale of depression are 134 (75.70 percent) respondents. While, there are 28 (15.80 percent) respondents who are having a mild depression. 6 (3.40 percent) respondents who are showing a moderate depression. 5 (2.80 percent) of the respondents shockingly suffered a severe depression. Up to 4 (2.30 percent) respondents suffered an extremely severe depression. The total of the male respondents who are going through a various scale of depression when counted is 177 respondents. As for female respondents, based on the scale of depression cross tabulation by gender shows that count number of female respondents who are scoring a normal scale of depression is 153 (56.50 percent) respondents. There are 64 (23.60 percent) respondents having a mild depression. 27 (10.00 percent) of them are going through moderate depression. The counts of respondents who are suffering severe depression are 18 (6.60 percent). The balance of 9 (3.30 percent) female respondents are suffering an extremely severe depression. The total of the female respondents who are going through a various scale of depression when counted is 271 respondents.

Based on the results shown in chi-square test, it means that there is a significant difference between male depression and female depression which means that gender does affect the level of depression in Islamic School (Madrasah) selected in this study both in Marang and Setiu district. It has been said that gender aspect is often disputed that it will affect the level of worker stress\(^{10}\). The results of the study were found to be consistent with the study conducted by\(^{11-12}\) that women’s staff were more depressed than male staff. Hence, it can be concluded that gender factors can influence the stress among the staff. The gender differences among adolescents begin to exist at the age of 13-14 years and significant differences will exist at the age of 17-18 years, where female adolescents will record higher rates than man adolescents. Other researchers say that girls are usually more susceptible to depression than boys\(^{13-15}\). Previous studies have found that there are significant differences between adolescent females and males who suffer from depression. According to a conducted study\(^{16}\), teenage girls are twice as likely to experience depression compared to boys. There also found that girls adolescent have higher scores of depression compared to boys\(^{17}\).

**Conclusion**

Several precaution steps can be taken into account in order to prevent depression from happens or to reduce the level of depression. Firstly, organizing more activities with groups that are not among the depressed individuals. This is because when an individual associated with other persons who are not of their own (family and close friends), they will be more open and willing to accept. Secondly, the welfare agencies in Malaysia need to focus more on students, especially for underprivileged students.

**Acknowledgement:** The authors thank the Faculty of Applied Social Sciences, Universiti Sultan Zainal Abidin (UniSZA), Kampus Gong Badak, Kuala
Terengganu for the permission to conduct this research. The authors also would like to thank selected Madrasah in Marang and Setiu district and, all respondents involved in this research.

**Ethical Clearance:** Nil

**Source of Funding:** University

**Conflict of Interest:** Nil

**REFERENCES**


9. Pearson KX. On the criterion that a given system of deviations from the probable in the case of a correlated system of variables is such that it can be reasonably supposed to have arisen from random sampling. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science, 1900, 50(302): 157-175.


Perspective of Malaysian Youths towards Homosexuals

Mohd Syaiful Nizam Abu Hassan¹, Ahmad Zafran Azhar¹, Nasriah Kamaruddin¹, Amanina Mohamad¹
¹Lecturer, Faculty of Applied and Social Sciences, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia

Abstract

Lesbian, gay, bisexual, and transgender are from the acronym LGBT. Gay are men who has emotions or feelings toward the men but although gay is also use for women too. They are men who are attracted towards the same sex and are unattached towards the opposite sex. Gay usually refers towards homosexual men or men who had sexual intercourse with other men. This research was conducted to identify the perspectives of teenage boys and girls towards homosexuals. The method that was used in this research was the quantitative method. XLSTAT with non-parametric tests were used in this research. A total of 1200 respondents were involved in this research. There were 664 male and 536 female respondents. A questionnaire was handed out to students of University Sultan Zainal Abidin (UniSZA), Gong Badak campus. The results showed that 6/10 from the research question were significant towards the perspective of youths toward gays. One of them is the first question which has a p-value of 0.160. This showed that there is significant difference between male and female towards gay to be allow to adopt a child.

Keywords: Lesbian, XLSTAT, University Sultan Zainal Abidin (UniSZA), p-value, Youths

Introduction

Nowadays, homosexuality has been widely discussed. It has become a phenomenon worldwide. It is spreading day after day. Efforts had been made to deter this activity but has not able to pull it off¹. Homosexuals came from a diverse background regardless of age, religion, and status. Sexuality rights have been around for the past two decades and has made a big difference. Sexual rights is one of the most controversial among other rights. This right has been the basis of many policies by many non-governmental organisations (NGO). This research shall discuss the perspectives of Malaysian youths towards gay². Homosexual is the act of sexual intercourse with the same sex. Besides that, homosexual also refers to the same sex couple who has special relationship together or in love with each other. Homosexual has existed for a long time which includes sexual activities and same sex marriage. Homo is a Greek word meaning “same” and Latin root word sex roughly means gender³-⁴.

The existence of the LGBTs in Malaysia started with the emergence of trannies during the 1980s. During that time, the government has stated that LGBT is immoral and can’t be made a lifestyle⁵. The act of changing one’s gender from male to female and vice versa will give a conundrum of an implication on Islamic laws including marriage, death, and prayer among others. This is why it is considered a sin and forbidden to change one’s gender in Islam. Men and women who aren’t clear what their gender are due to two sexual organs are asked to have surgery.

Homosexuals are men or women that has feelings or emotions toward the same sex⁶. They feel that their couple are a lot more understanding and follows their needs compared to opposite genders. They wanted more attention and love from their mate⁷. Society are quite worrying about teenagers nowadays as they are prone to be involve in immoral activities. One of the factors of homosexuality is the lack of religious education, lack of love from parents, influence of social media, and mental illness⁸.

Methodology

Participants: There are a total of 1177 respondents
consisting of various race and religion. Male consists of 663, while female has a total of 514. Respondents are UniSZA student from the Gong Badak campus. Respondents are between the ages of 18-27. They came from various states including Kuala Lumpur, Selangor, Pahang, Perak, Kelantan, Terengganu, Sarawak, Sabah, Pulau Pinang, Perlis, Negeri Sembilan, Melaka, Kedah and Johor. A majority of the respondents came from Terengganu is 269 in total. Respondents are picked randomly.

**Measures:** The research that was conducted is quantitative in form. This method was carried out by collecting information from respondents. The statistical descriptive is the study of current issues. Questionnaire are one of the method in descriptive research to get feedback from samples and make a generalisation on the population. Section A has 10 questions regarding perception towards lesbians. While, Section B consist of 10 questions on perception towards gay. Using the measurement scale respondents are required to tick one of the scale in the questionnaire. The measurement scale used in the questionnaire are: 1 = strongly disagree, 2 = disagree, 3 = not sure, 4 = agree, 5 = strongly agree.

Study sample consists of 1200 respondents from students of UniSZA, Gong Badak campus. The questionnaire was handed out randomly by the researcher. The output gained from the respondent depends on the aspects of validity and reliability. The researcher used a questionnaire that was used on past research. To get a viable validity respondents are were required to answer it individually. The method that was use is simple random sampling method. Respondents must be of the ages 12-25.

**Analysis Reliability Assessment Instrument:** This method gives equal chance for respondents to be chosen for the research. In order to gain validity and reliability, the data obtained must be analyse using XLSTAT to gain reliability value which is Cronbach alpha. Reliability is often related to stability and inner strength. Cronbach Alpha value is refer when measuring the inner strength of a construct. A Cronbach Alpha value that is above 0.60 is used as an index for reliability. While according to, the value of reliability that is below 0.60 is considered low and cannot be used, alpha value from 0.60 to 0.80 is acceptable while above 0.80 is excellent. In this research, the Cronbach Alpha is valued at 0.677. By referring to what was stated above, Cronbach Alpha value was used for the reliability of the questionnaire.

**Results and Discussion**

**Results:** Based on the non-parametric test that was conducted, the minimum reading for all variables is 1, while the maximum is 5. The average for every question is different. C1, which is gay couples should be allow to adopt, has a higher male average of 1.893% compared to female at 1.800%. C2, which is gays are disgusting has a higher average of males at 3.454% compared to females at 3.315%. C3, which is gay should not be allow to teach at school has a lower average for males at 3.030% compared to females 3.130%. C4, which is homosexuality is something that deviates from the norm shows a lower average for male at 3.229% and female at 3.352%. C5 which is homosexuality is a natural phenomenon also experienced by animals shows a lower average for male at 2.943% and female at 2.992%. C6 which is if a person is gay he should ignore and try to control his desire and seek help showed a lower average for male at 4.404% and female is at 4.685%. C7 is I won’t be disappointed if my child turns out gay showed a higher a male average at 1.816% than female at 1.414%. Homosexual is immoral is C8 with a lower average for male at 3.409% and female at 3.572%. C9 is I do not support gay marriage has a higher male average at 3.882% while female is at 3.759%. Lastly, C10 which is homosexuality is just a lifestyle nothing to make a fuss about has a higher male average at 2.012% compared to female at 1.562%.

**Table 1: Statistics of the Perspective of Youths by Gender towards Gay**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Gay couples should be allow to adopt a child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>P</td>
<td>514</td>
<td>1.800</td>
</tr>
<tr>
<td>C1</td>
<td>L</td>
<td>663</td>
<td>1.893</td>
</tr>
<tr>
<td>C2: I believe gays are disgusting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C2</td>
<td>P</td>
<td>514</td>
<td>3.315</td>
</tr>
</tbody>
</table>


**Table 1: Statistics of the Perspective of Youths by Gender towards Gay**

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Sub-question</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>T-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>L</td>
<td>663</td>
<td>3.454</td>
<td>1.411</td>
<td>1.411</td>
<td></td>
</tr>
<tr>
<td>C3</td>
<td>L</td>
<td>663</td>
<td>3.130</td>
<td>1.461</td>
<td>1.461</td>
<td></td>
</tr>
<tr>
<td>C4</td>
<td>L</td>
<td>663</td>
<td>2.992</td>
<td>1.518</td>
<td>1.518</td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td>L</td>
<td>663</td>
<td>2.943</td>
<td>1.582</td>
<td>1.582</td>
<td></td>
</tr>
<tr>
<td>C6</td>
<td>L</td>
<td>663</td>
<td>4.685</td>
<td>0.893</td>
<td>0.893</td>
<td></td>
</tr>
<tr>
<td>C7</td>
<td>L</td>
<td>663</td>
<td>4.404</td>
<td>1.102</td>
<td>1.102</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows all the variables that is represented for every question shows the significant score on the perspective of male and female youths towards gay. For the question C1, gay couple should be allow to adopt a child, the p-value is 0.160% which is more significant than 0.05. So, there is a significant difference between male and female youths in stating that gay couples should be allow to adopt a child.

C2 shows there is a significant difference between male and female in gays are disgusting. The p-value is larger than the significant level of 0.05 which is 0.237%. So, the researcher can reject Ho and accept Ha as there is a significant difference between male and female. C3 shows there is a difference in perspective between male and female on gays should not be allow to teach at school. The p-value is larger than the significant level of 0.05 which is 0.237%. So, the researcher can reject Ho and accept Ha as there is a significant difference between male and female. C4 shows no difference in perspective between male and female on homosexuality is a deviation from the norm. The p-value is less than the significant level of 0.05 which is 0.049%. The researcher can reject Ho and accept Ha in which there are no significant difference in perspective between male and female. C5 displays a difference in perspective between male and female on homosexuality is a natural phenomenon that is also experienced by animals. The p-value is above the significant level of 0.05 which is 0.649%. Ho can be rejected and accept Ha in which...
there is a significant difference in perspective between male and female.

C6 shows no difference in perspective between male and female on gays should control their desire and seek help. The p-value is less than the significant level of 0.05 at < 0.01. The null hypothesis is rejected and alternative hypothesis is used which means there are no significant difference between male and female. C7 shows no significant difference between male and female on not being disappointed if their child turns out gay. The p-value is less than the significant level of 0.05 at < 0.01. The Ho is rejected and Ha accepted as there is no significant difference between male and female. C8 shows a difference between male and female on homosexual is immoral. The p-value is greater than the significant level of 0.05 at 0.059%. The null hypothesis is rejected and Ha accepted as there is a significant difference between male and female. C9 shows a difference between male and female on not supporting same sex marriage. The p-value is higher than the significant level of 0.05 at 0.138%. The null hypothesis is rejected and Ha is accepted as there is no significant difference between male and female. C10 shows no difference between male and female on homosexuality is just a lifestyle nothing to make a fuss on. The p-value is less than the significant value of 0.05 at < 0.01. The null hypothesis is rejected and the Ha is accepted as there is no significant difference between male and female.

### Table 2: Difference by Gender between the Means in Non-Parametric for Two Independent Samples

<table>
<thead>
<tr>
<th>Variable/Test</th>
<th>Mann-Whitney</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>0.160</td>
</tr>
<tr>
<td>C2</td>
<td>0.237</td>
</tr>
<tr>
<td>C3</td>
<td>0.240</td>
</tr>
<tr>
<td>C4</td>
<td>0.049</td>
</tr>
<tr>
<td>C5</td>
<td>0.649</td>
</tr>
<tr>
<td>C6</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>C7</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>C8</td>
<td>0.059</td>
</tr>
<tr>
<td>C9</td>
<td>0.138</td>
</tr>
<tr>
<td>C10</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

### Discussion

Beforehand the word gay refers to the word happy or at ease. But, it usually means those who are homosexual. Nowadays, it exclusively means homosexuals compared to happy. Gay is the noun use to refer to an individual who is involve in a relationship with the same sex and gender, and make it a daily lifestyle openly. Those who have feelings towards the opposite sex but doesn’t accept the feeling and lifestyle, usually are not refer as gays. You are refer as one if you live its lifestyle. The term homosexual has been used as a sexual identity together with heterosexual and bisexual.

Besides that, when a person is attracted to someone of the same gender but does not have any relationship of any kind with that someone, that person is not refer as gay. However, a gay almost always have some kind of relationship with the same gender. The word gay is use for both men and women who are attracted toward the same sex. But, lesbian is specifically use for women who are attracted toward the same sex. There are cases when an individual develops feeling or attracted towards the same sex rejected those feelings and tried to overcome it, so they are not refer as gay. Once he accept it and live his life living the homosexual lifestyle, only then would he be called as a gay.

LGBTs should be monitored, kept at bay, and prevented through the syariah criminal law in Malaysia. A strict action must be taken so that they won’t continue to mock the institution of Islamic law in Malaysia. The existence of the Federal Constitution is to uphold and respect Islam as the religion of the federation and its law should not be meddle with and make a mockery off.

Besides that, LGBTs exist worldwide. They are a minority who not only has a misguided lifestyle, they also fight for it to be accepted by people around the world. But according to Islam, their fight for the perceived rights is totally misguided in the context of religious principles. Even though that is the case, this movement has been reeling for support and the do it openly and, discretely even though in majority Muslim Malaysia. So, preaching activities has to be active and widespread so that none will fall victim to this lifestyle and other vice activities. Besides that, preachers should use effective approach and varied in teaching Islamic values to the LGBT. Without us realising, the LGBT problem is getting severe and harming the harmonious life of society today. Although, LGBTs in Malaysia is still not accepted s it violates social ethics. Malaysia still make it illegal. The existence of new media has made LGBT lifestyle to carry out much easier and their numbers are increasing.
This research shows the perspective, feelings, and attitude of Malaysian youths toward homosexuals. The result matches with Malaysia’s stand on this issue which is, the homosexual culture is not accepted in this country. However, there are a small minority that accepts them. We can see that even though Malaysia is a majority Muslim country and Islam is the religion of the federation, there exist those who accept this lifestyle and culture. This can be seen with the formation of NGOs and organization who supports the homosexual communities. This parallel with the result of this research, the majority disapprove of homosexual and there are minorities who accept them.

Acknowledgement: The authors acknowledge to Faculty of Applied Social Science (FSSG) give permission to use the research facilities, provided the secondary data and supporting in this research.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

References


Factors Associated With Post-stroke Nutritional Status in Stroke Survivors under Rehabilitation

Chin Yi Ying¹, Sakinah Harith², Aryati Ahmad², Hassan Basri Mukhali³

¹Student, School of Nutrition and Diëtetics, Faculty of Health Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia; ²Lecturer, School of Nutrition and Diëtetics, Faculty of Health Sciences, Universiti Sultan Zainal Abidin, Terengganu, Malaysia; ³Lecturer, Faculty of Medicine, Universiti Sultan Zainal Abidin, Terengganu, Malaysia

Abstract

Malnutrition is a common phenomenon in stroke survivors. However, the extent of malnutrition and their associated factors in stroke survivors are yet to be discovered. This study aims to determine the prevalence of malnutrition and the factors associated with it. A cross-sectional study was conducted on 169 stroke survivors in Terengganu, Malaysia. Sociodemographic and clinical data were recorded using a structured questionnaire. Nutritional status was assessed using body mass index (BMI). Malnutrition was defined either BMI <18.5 kg/m² for subjects <60 years or BMI <20.0 kg/m² for subjects ≥60 years. Multivariable logistic regression was performed. The prevalence of malnutrition was 8.9% (men 55.0%, 51.5% were 60 years or older, with a median age of 60.0 ± 14.0 years. Median BMI was 25.4 ± 7.2 kg/m². Age was significantly associated with good nutritional status (adjusted OR, 1.10; 95% CI, 1.03 to 1.17; p=0.004). However, it is not associated with gender, educational level, household income, smoking history, previous stroke, and post-stroke physical condition. Age is the most important determinant in nutritional status of stroke survivors.

Keywords: Stroke, Nutritional status, Malnutrition, Rehabilitation

Introduction

Stroke is a significant global health burden and plays a role as the world’s second largest killer and has remained as the leading cause of death globally for the last 15 years¹. In Malaysia, stroke is the third leading cause of death (6.9%)² and is also one of the top three causes of disability-adjusted life years (DALYs) (6.0% of total DALY’s from all causes) in 2017³.

With the growing of aging population in the nation⁴ and increasing of stroke risk factors such as hypertension among Malaysian adults and elderly⁵, the incidence of stroke would increase, which in turn would increase expenditure and post threat to stroke-related healthcare system, patients and caregivers due to the post-stroke complications⁶. The estimated lifetime treatment costs for ischemic and hemorrhagic stroke patients in Malaysia were USD$ 8,607 and USD$ 8,928 respectively⁷. The impact of stroke burden can be significant when the outcomes, especially malnutrition, continue to be the serious issues in stroke patients.

To date, few studies have been carried out on assessing the nutritional status of stroke survivors during chronic phase, causing the nutritional status of this population beyond the acute phase of stroke to be neglected⁸. Malnutrition interferes with the recovery thereby affecting the stroke survivors to have a poorer response to rehabilitation⁹.

Stroke causes long-term disability and morbidity in an individual such as functional declines¹⁰, behavioral changes such as depression and dementia¹¹, declining in quality of life¹², eating and dysphagia¹³, as well as malnutrition¹⁴. These unfavorable conditions increase the catabolism of the body, and thereby the nutritional status of stroke survivors getting worse¹⁵.
Malnutrition is evident among stroke patients. Prevalence of malnutrition in stroke survivors during the chronic phase of stroke varies from 8.2% to 33.0%\textsuperscript{13,16-17}. Several studies have demonstrated that malnourished patients have serious complications such as infection, falls, dysphagia\textsuperscript{18} and are associated with increased mortality, increased morbidity, and a poorer functional recovery\textsuperscript{19,20}. Numerous factors that affect the nutritional status of stroke survivors were elderly, women, previous stroke\textsuperscript{21}, previous history of smoking\textsuperscript{17}, and subtype of stroke\textsuperscript{22}.

Realizing the prevalence of malnutrition provides an insight into the importance of early recognition of malnutrition and timely nutritional intervention for stroke survivors. Despite the proven negative outcomes of malnutrition, the monitoring of nutritional status is still lack of attention. Thus, the study conducted nutritional assessment and looks into the prevalence of malnutrition and the factors associated with malnutrition to ensure the greatest recovery in stroke survivors.

**Methodology**

This study was carried out among 169 stroke survivors who were followed-up to either rehabilitation medicine specialist clinic in Hospital Sultanah Nur Zahirah (HSNZ) or Rehabilitation Health Organization in Terengganu. We collected demographic and clinical information from stroke survivors or their caregivers using a standardized questionnaire. Nutritional status was assessed in terms of body mass index (BMI), which is calculated by weight (kg) divided by the square of height (m\textsuperscript{2}). Anthropometric parameter of body weight was measured on an electronic weighing scale, whereas standing height was measured using portable stadiometer.

Alternative anthropometric measurements were performed to stroke survivors who were unable to ambulate and wheelchair bound. The measurements required for the calculation of the predictive equation for body weight were mid-upper arm circumference (MUAC), knee height (KH), calf circumference (CC), and subscapular skinfold (SS). The equation used for the estimation of body weight are as follows; weight (men) = (0.98 x CC) + (1.16 x KH) + (1.73 x MUAC) + (0.37 x SS) - 81.69; while weight (women) = (1.27 x CC) + (0.87 x KH) + (0.98 x MUAC) + (0.4 x SS) - 62.35\textsuperscript{23}. Estimated height was obtained by demi-span measurement. The demi-span equations used to calculate the height are as follows; height (men) = 67.51 + (1.29 x demi-span) – (0.12 x age) + 4.13; while height (women) = 67.51 + (1.29 x demi-span) – (0.12 x age)\textsuperscript{24}. Measurements were performed by inelastic measuring tape on the non-paretic side of the body.

The BMI were categorized using Asian-specific BMI cut-offs\textsuperscript{25}: underweight (<18.5 kg/m\textsuperscript{2}), normal (18.5-22.9 kg/m\textsuperscript{2}), overweight (23.0-27.4 kg/m\textsuperscript{2}), and obese (≥27.5 kg/m\textsuperscript{2}). Malnutrition was defined either BMI <18.5 kg/m\textsuperscript{2} for subjects <60 years or BMI <20.0 kg/m\textsuperscript{2} for subjects ≥60 years\textsuperscript{13}.

The data was analyzed using IBM SPSS Statistics for Windows version 22.0 software. Descriptive statistics were performed for the characteristics of the respondents in this study. Multiple logistic regression was conducted to determine the predictors of malnutrition. P-values less than 0.05 were considered significant.

**Results and Discussion**

Stroke survivors consisted of 55.0% men and 45.0% women; with a median age of 60.0 ± 14.0 (range 26-82) years. As shown in Table 1, most of the survivors were Malay (96.4%), had secondary education (48.5%), not working (76.9%), without income (52.1%), and only 10.7% were smoker. Almost one-third of stroke survivors were ischemic stroke (71.0%) and 85.8% had their first-ever stroke. The median of post-stroke duration was 12 months. The most commonly reported comorbidity was a combination of hypertension, hyperlipidemia, and diabetes mellitus (33.7%).

**Table 1: Socio-demographic Characteristics of Stroke Survivors (n=169)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency (%)</th>
<th>Median (IQR)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>60.0 (14.0)</td>
<td>26-82</td>
<td></td>
</tr>
<tr>
<td>Age (categorical)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 60</td>
<td>82 (48.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 60</td>
<td>87 (51.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>76 (45.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>93 (55.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>163 (96.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>6 (3.6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The median of BMI of stroke survivors was 25.4 ± 7.2 kg/m². According to the Asian-specific BMI cut-off points, most of the stroke survivors were classified as obese (36.7%), whereas 4.7%, 29.6%, and 29.0% were categorized as underweight, normal, and overweight respectively. The prevalence of malnutrition was 8.9% (Table 2). There was a significant association between age and nutritional status. Older age stroke survivors were 10% higher risk of becoming malnourished compared to younger stroke survivors (95% confidence interval (CI) 1.03,1.17, p=0.004). However, malnutrition was not associated with gender, educational level, household income, smoking history, previous stroke, and post-stroke physical condition (Table 3).
Table 3: Associated Factors of Malnutrition among Stroke Survivors by Univariate Multivariate Logistic Regression Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Crude OR (95% CI)</th>
<th>P-Value(^a)</th>
<th>Adjusted OR (95% CI)</th>
<th>P-Value(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years)</strong></td>
<td>1.09 (1.03,1.16)</td>
<td>0.006</td>
<td>1.10 (1.03,1.17)</td>
<td>0.004</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Male</td>
<td>1.45 (0.50,4.19)</td>
<td>0.497</td>
<td>1.37 (0.33,5.80)</td>
<td>0.667</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chinese</td>
<td>5.77 (0.96,34.54)</td>
<td>0.055</td>
<td>2.68 (0.42,17.05)</td>
<td>0.297</td>
</tr>
<tr>
<td><strong>Educational level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Primary</td>
<td>0.51 (0.12,2.20)</td>
<td>0.364</td>
<td>0.43 (0.08,2.29)</td>
<td>0.321</td>
</tr>
<tr>
<td>Secondary</td>
<td>0.17 (0.04,0.75)</td>
<td>0.020</td>
<td>0.22 (0.03,1.51)</td>
<td>0.123</td>
</tr>
<tr>
<td>Tertiary</td>
<td>0.21 (0.03,1.29)</td>
<td>0.092</td>
<td>0.37 (0.04,3.39)</td>
<td>0.379</td>
</tr>
<tr>
<td><strong>Household income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without income</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>With income</td>
<td>0.51 (0.17,1.57)</td>
<td>0.243</td>
<td>0.79 (0.20,3.20)</td>
<td>0.745</td>
</tr>
<tr>
<td><strong>Smoking status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-smoker</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ex-smoker</td>
<td>0.33 (0.04,2.63)</td>
<td>0.293</td>
<td>0.31 (0.03,2.81)</td>
<td>0.297</td>
</tr>
<tr>
<td>Smoker</td>
<td>1.15 (0.24,5.60)</td>
<td>0.866</td>
<td>1.37 (0.26,7.25)</td>
<td>0.714</td>
</tr>
<tr>
<td><strong>Stroke history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-ever stroke</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Stroke recurrence</td>
<td>0.41 (0.05,3.25)</td>
<td>0.396</td>
<td>0.33 (0.04,2.86)</td>
<td>0.315</td>
</tr>
<tr>
<td><strong>Post-stroke physical condition (hemiparesis)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>Reference</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Left</td>
<td>2.16 (0.71,6.62)</td>
<td>0.177</td>
<td>2.85 (0.88,9.24)</td>
<td>0.082</td>
</tr>
</tbody>
</table>

Odds ratio (OR); 95% confidence interval (CI)

\(^a\) Binary logistic regression

\(^b\) Backward LR multiple logistic regression model was applied
Hosmer-Lemeshow test, \((p=0.733)\), classification table (overall classified percentage=91.1%) and area under the ROC curve (73.1%) were applied to check the model fit.

The average age of stroke survivors found in our study was younger than the age reported in our nationwide hospital-based registry which was accounted for 62.7 years\(^26\). Stroke is no longer interpreted as commonly prevalent in the elderly\(^27\). The current study reveals that stroke is emerging in almost half of these stroke survivors in adulthood. The changing of stroke incidence across the age spectrum may be due to the increasing prevalence of stroke risk factors such as hypertension in adults\(^28\). This study also found that the prevalence of malnutrition among stroke survivors was slightly higher than study in Hong Kong (8.2%)\(^17\), but lower compared to other studies including among stroke survivors in Denmark (22.0%)\(^16\) and Swedish (33.0%)\(^13\).

These broad discrepancies in prevalence rates are due to the nutritional assessment methods and the timing of measurement\(^29\).

The results for previous history of smoking as a significant risk factor for malnutrition in stroke patients are inconsistent. A previous study \(^17\) reported that previous history of smoking was associated with malnutrition. Nonetheless, our study found no significant association which is in agreement with that of the review\(^30\). Previous stroke was not significantly related to malnutrition in our study. On the contrary, previous stroke was identified as an important risk factor for malnutrition in other studies\(^21,30\). Gender, post-stroke hemiparesis, socioeconomic status, and education level were not considered as the risk factors for malnutrition, supported by the previous study\(^31\).

In concordance with previous findings\(^20-21\), the present study has shown that malnutrition in stroke survivors is influenced by age. Hemiparesis presented in all stroke survivors may result in the changes of body composition such as decrease in fat-free mass in the paretic side\(^9\). Additionally, the elderly have been found to be at high risk of undernutrition\(^32\). Therefore, the nutritional status of stroke survivors worsens with the accompanying ageing process.

This study recommends that the nutritional assessment in stroke survivors is necessary for malnutrition checking to enhance optimal recovery and rehabilitation. Nutritional intervention strategy, such as dietary intake and anthropometric assessment, is targeted to these at-risk stroke survivors to limit the impact of undernutrition on stroke outcomes. Further investigation is needed to determine the exact mechanism and risk factors of malnutrition in stroke survivors due to the inconclusive previous studies.

**Conclusion**

Stroke has become a global health problem. Early recognition of malnutrition significantly affects the outcomes. The optimization of nutritional status is essential to reduce the risk of developing further complications including physical, metabolic dysfunction, to recover from stroke rehabilitation, and lastly to improve health and quality of life of stroke survivors.

**Acknowledgement:** This research was supported by a research grant (UniSZA/2017/SRGS/15) from Universiti Sultan Zainal Abidin. We would like to express our gratitude to all those who have helped in the writing of this article.

**Ethical Clearance:** Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia [Registration: NMRR-17-3150-39377 (IIR)] and UniSZA Human Research Ethics Committee (UHREC) [UniSZA.C/1/UHREC/628-1 Jld.2 (42)]

**Source of Funding:** University

**Conflict of Interest:** Nil

**References**


Effect of Phytochemicals in *Phoenix Dactylifera* L. on Human Body Using LC-QTOF-MS

Sabri Nurul Elma¹, Dzulfadli Rosli², Khalilah Badarusham¹, Shamala Salvamani¹³, Mohd Sukri Hassan¹

¹Lecturer, Faculty of Science and Technology, Universiti Sains Islam Malaysia, 71800 Bandar Baru Nilai, Negeri Sembilan, Malaysia; ²Lecturer, Institute of Halal Research and Management (IHRAM), Universiti Sains Islam Malaysia, 71800 Bandar Baru Nilai, Negeri Sembilan, Malaysia; ³Lecturer, Division of Applied Biomedical Science and Biotechnology, School of Health Sciences, International Medical University, 57000 Bukit Jalil, Kuala Lumpur, Malaysia

Abstract

The presence of nutrients and phytochemicals including alkaloids, sterols, phenols and flavonoid in *Phoenix dactylifera* L. has been related to the health-benefits of date fruits consumption. Metabolomics study has been conducted to explore the human urine metabolome modifications after date fruits intake. After overnight fasting, urine samples were collected before the ingestion at 0h and every 4 hours after the consumption of date fruits at 4-24-h. Samples were analysed using LC-QTOF-MS, followed by Principal Component Analysis (PCA). Results revealed the changes of urinary metabolome during the 24 h after date fruits intake. Some phytochemicals, including alkaloids, sterols, phenols and flavonoids were appeared and disappeared after date fruits intake. These findings confirm that metabolomics is an effective tool that can be practiced in order to further discover the metabolism of phytochemicals and its relation with human health.

Keywords: Ajwa dates, Human urine, Liquid chromatography mass spectrometry (LCMS), Metabolomics, Principal component analysis (PCA)

Introduction

Metabolomics investigations attempt to detect and profile the changes in metabolites, which reflect changes in metabolic pathways and may provide information concerning a disease state or the biological stress of an organism¹ or for discovery of biomarker². There are two metabolomics based analyses; nuclear magnetic resonance (NMR-based) and mass spectrometry (MS-based). 1H-NMR-based is widely used in metabolomics study as it can simultaneously display resonance peaks resulting from hundreds of metabolites³⁴, requires little or no sample preparation⁴⁵ and highly reproducible and non-destructive⁶. Meanwhile, many researches using MS-based analysis due to the high sensitivity and selectivity. For instance, Liquid Chromatography Mass Spectrometry (LCMS) could be benefited from lower detection limits and improved MS data quality due to reduced background noise⁷⁸ stated that Gas Chromatography Mass Spectrometry (GCMS) gives high resolution chromatographic separation and wide applicability through derivatization.

In our previous study using 1H-NMR-based metabolomics indicated that a complete recovery of 24 hours after the Ajwa dates intake as a result of the urinary metabolome 24 hours after consuming Ajwa dates back to blank (0 hour). In other words, the effect of ajwa dates remained in body within 24 hours (unpublished data). Thus, in order to study the beneficial effect of Ajwa dates in human health, metabolomic study on the consumption of Ajwa dates flesh has to be performed. The aim of this study is to investigate the changes of metabolites in urine after the consumption of Ajwa dates using LC-QTOF-MS.

Methodology

Ten healthy volunteers (5 females and 5 males) between 20 and 25 years old with body mass index of
20-25 were enrolled with informed written consent. This study was approved by the Human Ethics Committee (HEC) of Universiti Sains Islam Malaysia (USIM/JKEP/2016-14). Subjects were required to fasting overnight and follow the control diet, which exclude fruits and vegetables, supplements and beverages such as tea, coffee, fruit juice or any bicarbonate drinks. Equal meals were given to subjects during the experiment after considering their food allergy.

The urine samples were obtained before consumption of Ajwa dates as blank (0h). Immediately, all subjects consumed 7 Ajwa dates that were given. Urine were collected at 4, 8, 12 and 24 hours after the consumption of Ajwa dates, which were at 11 am, 3 pm, 7 pm and 7 am (the next day), respectively. All the collected urine were stored in -20 °C. This design was followed Lopez et al (2014) with some modifications. Organic solvent used in this study is methanol (Merck, Darmstadt, Germany).

This method was followed by previous research with some modifications. Briefly, the urine samples were thawed before the analysis and vortexed using vortex mixer to homogenize the sample. An aliquot of urine (2.0 mL) was filtered using syringe filter (0.25 μm) and then centrifuged at 13 000 rpm for 5 min to remove the precipitate. The supernatant (1.0 mL) was transferred into a vial (2.0 mL) and diluted with an organic solvent; methanol (0.5 mL) and then well mixed. The prepared sample directly injected to LC-QTOF-MS.

Urine analysis was performed on ACQUITY UPLC I-Class system (WATERS Corporation, MA, USA) instrument. Compounds were chromatographically separated using a column ACQUITY UPLC HSS T3 (100 mm x 2.1 mm x 1.8 μm), maintained at 40 °C. A linear binary gradient of water (0.1 % formic acid) and acetonitrile was used as mobile phase A and B, respectively. The mobile phase composition was changed during the run as follows: 0 min, 1% B; 0.5 min, 1% B; 16.00 min, 35% B; 18.00 min, 100% B; 20.00 min, 1% B. The flow rate was set to 0.6 mL/min and the injection volume was 1.0 μL. The UHPLC system was coupled to a Vion IMS QTOF hybrid mass spectrometer, equipped with a Lock Spray ion source. Data were acquired in high-definition MS (HDMS®) mode in the range m/z 50 - 1500 at 0.1 s/scan. Thus, two independent scans with different collision energies (CE) were alternatively acquired during the run: a low-energy (LE) scan at a fixed CE of 4 eV, and a high-energy (HE) scan where the CE was ramped from 10 to 40 eV. Argon (99.999%) was used as collision-induced-dissociation (CID) gas.

The multivariate analysis has been done using Unscrambler 10.3 (CAMO Software, Norway) which is a complete multivariate data analysis software solution, equipped with powerful methods including Principal Component Analysis (PCA), Partial Least Square (PLS), clustering and classification. The Unscrambler 10.3 is an ideal tool to analyze any sort of multivariate data quickly, easily, and accurately.

**Results and Discussion**

From our previous GCMS results, Ajwa dates flesh was found to have possible pharmacological functions such as antioxidants, antimicrobial, anticancer, antifungal, antidiabetic, anti-inflammatory, anticonvulsant and anti-asthmatic. According to previous study, phytochemicals that rich in dates pulp are like phenolics, sterols, carotenoids, anthocyanins, procyanidins and flavonoids. The ratio and concentrations of these constituents depend on the type of the fruit, stage of fruitpicking, location and soil conditions. A research who studied Algerian dates stated that the results obtained for phenolic content were much higher than Omanian dates. Another study indicated that mono and di-glycosides identified in dates fruits were mostly flavonol derivatives (quercetin) and flavone derivatives (luteolin and apigenin).

In this study, compounds that had been identified in Ajwa date flesh using LC-QTOF-MS are quercetin, apigenin, caffeic acid, rhoifolin, crocetin, procyanidin, cyanidin, ferulic acid, glucoside, glucopyranoside, trimethylgallic acid, quercimetrin, proanthocyanidin, pyrogallic acid, coumatic acid, luteolin, β-sitosterol, decaffeolaceoside, elaecyanidin and glucosyringic acid.

Metabolomics originally refers to the sum of the pool of cell metabolites. This brief review of result focuses on untargeted metabolomics using LC-QTOF-MS. Investigation on the urinary metabolome could further confirm the beneficial effect of Ajwa dates in human health. There are a number of metabolites identified in 0h (blank) only such as flavonoids; Cnidimol F, Kushenol I, Kushenol M, Kushenol T, Liquiritin, Pachypodol and Sanggenon J, alkaloids; Ephedradine B, Isomaistemonine, Melicopidine, Piperyline and Pellitorin, phenolics; Feruperine and
Glabrol. Other known compounds that identified in blank urine are Isoanhyoicaritin and Riboflavin.

Urinary metabolome that appeared after 4h consuming Ajwa dates flesh are flavonoids; 2-Methoxykurarinone, Bavachin (Corylifolin), Kaempferol-3-O-α-L-arabinoside, Leachianone G and Licoflavone, alkaloids; Codonopsine and Nigeglanine. Other compounds that identified after 4h Ajwa dates intake are Ophiopogonanone B and Retusine. Meanwhile, 2 alkaloids; Loganin and Polycanthine, 1 phenolic compound; Eugenyl glucoside and 1 sesquiterpene; Pseudosantonin were identified in 8h after consumption of Ajwa dates flesh. Geniposidic acid and Paeonilactone A is another compound that found in the same urine time collection (8h). And there is only 1 known compound that appeared after 12h consuming Ajwa dates flesh which is Methyl lucidenate Q.

Most urinary metabolome appeared after 24h Ajwa dates flesh consumption. There are 32 urinary metabolome including alkaloids, phenol, amino acid, flavonoids, terpene glycoside and terpenoid. Other known compounds found to be appeared in 24h after Ajwa dates intake are Ajugasterone C-2,3,20,22-diacetonide, Andropanolide, Bruceine H, Citric acid, Cyclo(Ala-Ile), Dehydroabietic acid, Desmodimine, Glucosyringic acid, Glutamine, Heterodendrin, Kusulaactone, Linustatin, Methyl-α-D-fructofuranoside, Methyl-β-D-fructofuranoside, Morusimic acid F, Mudanpioside F, Paeonisuffrone, Paenolide, Pterodontriol D, Ranunculin, Schizonepotoside E, Scutellone E, Sibiricaphenone and Vitamin B5. Alkaloids that identified are Coniferol, Gentianine and Picrasidine P. Meanwhile other compounds are phenol; Ginkgolic acid, flavonoid; Lutonarin, amino acid; Tyrosine, terpene glycoside; trans-Carveol-6-β-glucopyranoside and terpenoid; Xanthatin.

Some peaks were spotted appeared and disappeared in the chromatogram. There also peaks that belong to certain compounds remain in almost all the time collection (0h to 24h). The compounds named 6-Hydroxykynurenic acid, Adenosine, Coixol, Cuscohygrine, Dictysine, Evoxanthine, Isoxanthohumol, Lindelofine, Magnocurarine, Neokurarinol, Oxymaistenonine, Uridine and Xanthosine (black color in Figure 1).

![Figure 1: Scores and Loadings Plot of Urinary Metabolomes 24h after Consuming Ajwa Dates Flesh in Positive Ionization](image-url)
All healthy respondents are required to follow the given diet schedule in which, they are allowed to drink plain water only during one week experiment, the same dietary intake (breakfast, lunch and dinner). No fruits, vegetables or beverages are allowed during experiment. They also required to fasting overnight. It is because we have to lessen the consequence of the metabolites change from other sources. Compared to urinary metabolome identified in 0h, more urinary metabolome are appeared after the consumption of Ajwa dates flesh. The metabolism pathway of the urinary metabolome before and after Ajwa dates intake should be investigated to study the beneficial effects of Ajwa dates to human body.

One of the techniques in chemometric had been used in this study is Principal Component Analysis (PCA). This technique is a powerful tool to help us to comprehend the multivariate data. The scores plot elucidating the urinary metabolome and the loadings plot is the urine time collection. The urinary metabolome that identified only in respective time collection has been highlighted. As illustrated, the scores and loadings plot pattern is similar. Urinary metabolome that had been circled in scores plot are belongs to each time collection in loadings plot, accordingly. The metabolome that scattered in between time collection are showing that metabolome had been identified in both or more time collection.

Conclusion

Phytochemicals that rich in Ajwa dates flesh are phenolics, sterols, carotenoids, anthocyanins, procyanidins and flavonoids. Results revealed the changes of urinary metabolome during the 24 h after date fruits intake. Some phytochemicals, including alkaloids, sterols, phenols and flavonoids were appeared and disappeared after date fruits intake. Investigation on the urinary metabolome could further confirm the beneficial effect of Ajwa dates in human health. These findings confirm that metabolomics is an effective tool that can be adept in order to further discover the metabolism of phytochemicals and its relation with human health.

Recommendations: In future, there should be a study that focuses on discovery of the effects of dates flesh which differ in quantity of date fruits.

Acknowledgement: This research is funded by Niche Research Grant Scheme (USIM/NRGS_P5/ISI/8405/52113), Ministry of Higher Education (MOHE).

Ethical Clearance: This study was approved by the Human Ethics Committee (HEC) of Universiti Sains Islam Malaysia (USIM/JKEP/2016-14)

Source of Funding: University

Conflict of Interest: Nil

References


22. Tseng YT, Chen CS, Jong YJ, Chang FR, Lo YC. Loganin possesses neuroprotective properties, restores SMN protein and activates protein synthesis positive regulator Akt/mTOR in experimental models of spinal muscular atrophy. Pharmacological Research, 2016, 111: 58-75.


Phytochemistry and Antibacterial Activity of Cynometra Cauliflora

Noor Zarina Abd Wahab¹, Norhidayah Badya², Nazlina Ibrahim³, Mohd Khairul Amri Kamarudin⁴

¹Lecturer, Faculty of Health Sciences, Universiti Sultan Zainal Abidin, Malaysia; ²Lecturer, Faculty of Medicine, Universiti Sultan Zainal Abidin, Malaysia; ³Associate Professor, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Malaysia; ⁴Lecturer, East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin, Malaysia

Abstract

Here we report the potential of Cynometra cauliflora methanolic leaves extract as potential antibacterial agent against clinical isolated microorganisms. Phytochemical analyses reveal the presence of tannin, flavonoid, saponins, cardiac glycosides and terpenoids. In spot test, antibacterial activity can be observed through the formation of zone inhibition of three types of bacteria only which are at concentration of extract used were 75 mg/mL and 100 mg/mL. The MIC was determined ranging from 6.25 mg/mL to 100 mg/mL. The highest value of MIC showed by MRSA which is 6.25 mg/mL. For MBC test, no antibacterial activity have been observed showed that the extract was bacteriostatic which can inhibit the growth of bacteria at concentration less than 100 mg/mL but not kill the bacteria. The results provide evidence that leaves of C. cauliflora extract might indeed be used as a potential source of effective natural antimicrobial agents in pharmaceutical industries. Our findings suggest that C. cauliflora methanolic leaves extract contains antibacterial active compounds and could be potential antibacterial agent.

Keywords: Cynometra cauliflora, phytochemistry, cytotoxicity, antibacterial

Introduction

Emerging of antibiotic resistance cases and the insufficiency of effective new antimicrobials agent has long been noticed. The biggest problem in global health care is the requirement for novel, effectual and inexpensive medicines to treat microbial infections without unnecessary side effects¹. Thus, exploration for a new antimicrobial compound or drugs with different antimicrobial targets is necessary. Plant origin medicines are comparatively cheaper than synthetic substitutes, offering great therapeutic benefits and more affordable treatment².

The medicinal value of plants depends on their phytochemical constituents that provide a vital physiological or pathological effects in the human body³. These bioactive constituents are tannin, flavonoid, alkaloids, phenol compounds, saponin, glycoside and anthraquinones⁴. The knowledge of phytochemical composition of plant is important for the development of novel natural products with therapeutic potential. Many plant extracts are known to have antimicrobial properties. In recent years, several studies have evaluated antimicrobial activity of crude plant extracts⁵⁻⁸. About 20% of medicinal plants have been used in pharmaceutical studies especially in cancer and dangerous diseases prevention and treatment⁹. Plants are able to produce the variety of bioactive substances. High contents of phytochemicals in fruits and vegetables may protect human body destruction against free radical¹⁰.

Cynometra cauliflora L. or commonly known as ‘Nam-Nam’ among native Malaysian is a tropical plant under the Fabaceae family. It is a homegrown fruit-bearing tree that is found primarily in rural areas of Peninsular Malaysia¹¹. This plant is a neglected and underutilized traditional fruit tree that has the

Corresponding author:
Noor Zarina Abd Wahab
E-mail: zarinawahab@unisza.edu.my
medicinal properties in traditional medicine and planted as decorative plant in the village\textsuperscript{13}. The fruit which are kidney-shape pod, greenish yellow to brown, with a sandy and wrinkled surface can be consumed as fruit salad\textsuperscript{13}. Previous studies have shown antioxidant, anti-inflammatory, antitumor, antidiarrheal and antidiabetic activity of \textit{C. cauliflora}\textsuperscript{14-15}.

Phytochemical screening of \textit{C. cauliflora} aqueous extract from different plant parts showed the presence of tannins, saponins, flavonoid, terpenoid and cardiac glycosides are present in all parts of the plant\textsuperscript{16}. Thus, this study was carried out to evaluate phytochemical constituent and antibacterial activity of \textit{C. cauliflora} methanol leaves extract in search for active antimicrobial activity.

**Methodology**

**Plant Material:** The plant materials were cleaned with distilled water then dried in shade at room temperature (27±2°C) and pulverized using electric blender (Kenwood Ltd., Harvant, United Kingdom). The resulting powder was kept in air tight container until required.

**Phytochemical Analysis:** For the phytochemical analysis and evaluation of the medicinal potential of \textit{C. cauliflora}, methanolic extract was prepared from leaves\textsuperscript{17}. Dried leaves powder of \textit{C. cauliflora} was extracted with methanol. \textit{C. cauliflora} leaves (100 g) was macerated with methanol (300 ml) to produce crude methanol extract. The extract was filtered and evaporated to dryness.

**Test for Tannin:** 1 mL of 0.1% ferric chloride was added to the extract. The formation of dark green or blue green coloration indicates the presence of tannins\textsuperscript{18}.

**Determination of Saponin:** 2 mL extract solution was diluted with distilled water and was shaken for 15 minutes. The formation of soap-like foam layer indicates the presence of saponins\textsuperscript{19}.

**Detection of Steroid:** 10 mg of extract was dissolved in 2 ml of chloroform and 2ml of concentrated sulphuric acid. The tube was shaken well. Chloroform layer appeared red after few minutes. These confirm the presence of sterols steroid\textsuperscript{20}.

**Test for Anthraquinones:** 50 mg of the extract was boiled with 1 ml of sulphuric acid and filtered. Filtrate was added with 500 µL and shaken. Chloroform layer was transferred to another tube and mixed with 400 µL of 25% of dilute ammonia. The presence of pink, red or violet colour indicates the presence of anthraquinones\textsuperscript{21}.

**Test for Alkaloids:** 2 mL of 25% ammonia was added to 10 mg/mL of extract. After that, 5 ml of chloroform was added to the mixture. Test tube was shaken for few minutes. A few drops of Mayer’s reagent were added. The formation of a cream colored precipitate indicating the presence of alkaloids.

**Test for Cardiac Glycosides:** 50 mg of extract was diluted in 2 ml of chloroform. Then, 1 ml of concentrated sulphuric acid was added. The presence of a brown ring indicates the presence of deoxysugar.

**Test for Flavonoids:** About 10 mg of extract was added to 2 mL of 25% dilute ammonia. Followed by concentrated sulphuric acid (500 µL) was added. Appearance of yellow colouration indicates the presence of flavonoids.

**Test for Terpenoids:** 10 mg of extract was dissolved in 2 ml of chloroform and 3 ml of concentrated sulphuric acid was added to form a layer. The formation of a reddish brown colouration of the interface indicates the presence of terpenoids\textsuperscript{22}.

**Test Pathogens:** Four pathogenic Gram positive bacteria, \textit{Staphylococcus aureus} (ATCC 11632), Methicillin-resistant \textit{Staphylococcus aureus} (MRSA) (ATCC 43300), \textit{Streptococcus mutans} (ATCC 25175), \textit{Streptococcus pyogenes} (ATCC 12344) and four pathogenic Gram negative bacteria, \textit{Shigella sonnei} (ATCC 25931), \textit{Klebsiella pneumoniae} (ATCC 10031), \textit{Vibrio cholera} and \textit{Escherichia coli} (ATCC 10536) were used. Bacterial strains were grown and maintained on Mueller-Hinton agar (MHA).

**Antibacterial Test:** Overnight cultures (10\textsuperscript{7}-10\textsuperscript{9} CFU mL\textsuperscript{-1}) of bacteria strains were inoculated as a 5 µL spot on MHA plates and incubated at 37 °C for 24 h. Subsequently, colonies were exposed to 5 µL extract with concentrations of 100, 50, 25, 10 or 5 mg/ml of extract. Positive control was performed using chloramphenicol and 10% methanol was used as negative control. The plates were incubated aerobically at 37 °C. The diameter of the zone of inhibition surrounding the disks were examined and scored\textsuperscript{23}.
Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC): MIC was performed to determine the lowest concentration of the plant extract that inhibits the growth of a microorganism\(^{24}\). Two sets of standardized microdilution plates with shallow wells that contain increasing dilutions (decreasing concentration) of plant extract was inoculated with bacterial suspensions. The plates were incubated at 37°C for 24 h.

The lowest concentration of the extract in the well of the microtiter plate that showed no turbidity after incubation are MIC. Bacterial suspensions were used as negative control, while broth containing standard drug was used as positive control. MBC was determined when the lowest concentration of the plant extract that yields no growth was subculturing or second inoculation and then incubating 37 °C for 24 hr. Positive and negative cultures were also prepared.

Results and Discussion

Phytochemical analysis shown in Table 1 indicates the crude extract does not contain alkaloids, steroid and anthraquinones. Methanol is a less polar solvent compared to water thus lesser ability for the phytochemical to be extracted\(^{25}\).

Therefore methanol is commonly used for extraction of bioactive compounds. Flavonoids, saponins, tannin, steroids and alkaloids were obtained in the test samples is secondary metabolites that played the important role in cell growth, replacement and body building\(^{26}\). Plant origin antimicrobials have great therapeutic values as they can provide lesser side effects than synthetic antimicrobials\(^{27}\).

Table 1: Phytochemical Analysis of *Cynometra Cauliflora* Methanolic Extract

<table>
<thead>
<tr>
<th>Phytochemical Substances</th>
<th>+ (Present) / - (Absent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flavonoid</td>
<td>+</td>
</tr>
<tr>
<td>Alkaloids</td>
<td>-</td>
</tr>
<tr>
<td>Saponin</td>
<td>+</td>
</tr>
<tr>
<td>Tannin</td>
<td>+</td>
</tr>
<tr>
<td>Glycosides</td>
<td>+</td>
</tr>
<tr>
<td>Steroid</td>
<td>-</td>
</tr>
<tr>
<td>Triterpenoids</td>
<td>+</td>
</tr>
<tr>
<td>Anthraquinones</td>
<td>-</td>
</tr>
</tbody>
</table>

In the present research work, in vitro spot assay was performed against eight bacterial species to evaluated antibacterial activity of the extract. The data in Table 2 show the antibacterial activities of the tested extracts on a panel of four Gram positive and four Gram negative bacteria.

Most microorganisms tested were found not susceptible to the extract except *S. aureus* and MRSA. At 75 and 100 mg/mL, extract showed a slightly higher antibacterial activity with mean zones of inhibition 6 and 7 mm against *S. aureus* meanwhile, 8 and 10 mm against MRSA, respectively. Only Gram positive bacteria, *S. aureus* and MRSA were susceptible to the extract, while neither of the Gram negative bacteria showed any inhibition.

Gram positive bacterial strains were less resistance to the extracts when compared to Gram negative bacteria. The Gram negative bacteria are resistance to the extracts because of its thin cell wall and partly because of the relatively large quantities of lipoproteins and lipopolysaccharide in the wall, which could inhibit the attachment of the active compound from the plant extract\(^{28}\). Our founding is complement with the previous result gained from the earlier report which has proven that Gram positive bacteria are less resistant to the antimicrobial agent origin from plant compared to Gram negative bacteria\(^{29}\).

Table 2: Antibacterial Activity of Extracts against Bacterial Species Tested By Spot Assay

<table>
<thead>
<tr>
<th>Bacterial Strains Tested</th>
<th>Inhibition Zone of Extract (mm)</th>
<th>Inhibition Zone of Control (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 mg/mL</td>
<td>50 mg/mL</td>
</tr>
<tr>
<td><em>S. aureus</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>MRSA</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>S. mutans</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>S. pyogenes</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>S. sonnei</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>K. pneumoniae</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>V. cholerae</em></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
The results in Table 3 showed that the minimum inhibitory concentration (MIC) of the extract ranged between 6.25 and 12.5 mg/ml against both \textit{S. aureus} and MRSA. It is worthy of note that MBC values obtained for the extract against \textit{S. aureus} and MRSA are higher than MIC, indicating that the extract is bacteriostatic at lower concentration and bactericidal at higher concentration.

This suggests that the extract, when used traditionally as antimicrobials will be effective to inhibit bacteria growth but not necessarily kill the bacteria.

\textbf{Table 3: MBC and MIC Values of Extract}

<table>
<thead>
<tr>
<th>Bacterial Strains Tested</th>
<th>MIC (mg/ml)</th>
<th>MBC (mg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{S. aureus}</td>
<td>12.5</td>
<td>&gt;100</td>
</tr>
<tr>
<td>MRSA</td>
<td>6.25</td>
<td>&gt;100</td>
</tr>
<tr>
<td>\textit{S. mutans}</td>
<td>25.0</td>
<td>&gt;100</td>
</tr>
<tr>
<td>\textit{S. pyogenes}</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>\textit{S. sonnei}</td>
<td>100.0</td>
<td>&gt;100</td>
</tr>
<tr>
<td>\textit{K. pneumoniae}</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>\textit{V. cholerae}</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>\textit{E. coli}</td>
<td>&gt;100</td>
<td>&gt;100</td>
</tr>
</tbody>
</table>

\textbf{Conclusion}

The findings indicated that the methanolic extract prepared from \textit{C. cauliflora} leaves has good potential for prospective nature-based antimicrobial drug. Further studies are needed to investigate the exact mechanism of their antimicrobial action, purification and characterization of their bioactive contents.

\textbf{Ethical Clearance:} Nil

\textbf{Source of Funding:} University

\textbf{Conflict of Interest:} Nil

\textbf{References}


Spatial Model of Non-Ionizing Radiation Exposure around Gong Badak

Nurul Syafiqah Hassim¹, Roslan Umar¹, Nor Hazmin Sabri², Khairul Anwar Rosley², Hajar Jaafar³, Roha Tukimin⁴, Shamesh Raj A/L Parthasarathy⁴

¹Lecturer, East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin Gong Badak Campus, 21300, Kuala Nerus, Terengganu Malaysia; ²Lecturer, School of Fundamental Science Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia; ³Lecturer, Faculty of Electrical Engineering, Universiti Teknologi MARA, 23000 Dungun, Terengganu, Malaysia; ⁴Lecturer, Radiation Safety and Health Division, Malaysia Nuclear Agency, Bangi, 43000 Kajang, Selangor, Malaysia

Abstract

This study describes an evaluation of Electric Field (EF) strength around Gong Badak located at Kuala Nerus, Terengganu. This area was selected because it is categorized as residential area and the population density is high due to its location nearby learning institute (Institute of Industrial Training Gong Badak). Spectrum analyzer connected to an omni-directional antenna was used to measure the EF strength. The measurement was obtained for 10 minutes for each 26 selected points. The data was then analyzed to determine the highest EF exposure level detected at each site. The spatial model of EF exposure using GIS software was then developed to get the map of exposure. The value of highest exposure was compared with the permitted limit recommended by ICNIRP and previous study. From the analysis, it can be concluded that the exposure level at selected area were still below the ICNIRP limit. However, the value is quiet high which is approximately 25.05 V/m peaked at 2137.5 MHz. The results of this study will complement existing studies that have been done at around Kuala Nerus area. This exposure map can be used to propose the government to revise the policy and guidelines for non-ionizing radiation safety. The Ministry of Health Malaysia may utilize the map to monitor the EF exposure in this country for public health purpose.

Keywords: Electric field strength, Spatial model, Highest exposure, ICNIRP limit, Exposure map

Introduction

In recent years it has increased public concern due to health risks from radiation emissions from wireless communication systems. All wireless electronic devices generate electromagnetic fields (EMFs). EMF propagates through space and interferes with other electromagnetic changes around them. Users will be exposed to electromagnetic radiation (EM) in the field near the EM source¹. The wireless system is part of our daily life today which has become a necessity and operate at a frequency below 300GHz which is in a non-ionizing spectrum which does not have enough energy to remove electrons from the atom².

EMF may be classified as non-ionizing radiation (NIR) and known to be hazardous because of it has the ability to promote health effects if the amount of radiation received is excessive⁴. However, the potential EMR health effects radiated by them are still the subject of public debate. Due to the issue, there are several organizations investigating the potential of non-ionizing radiation effects and offering international standards at exposure limits, such as the International Commission on Non-Reflective Radiation Protection (ICNIRP) and the Institute of Electrical and Electronic Engineering⁴. Electromagnetic waves are generated from many sources which is both natural and man-made, that produce background levels of electromagnetic radiation. The numbers of sources that emit electromagnetic waves such as radio and TV transmitters, base stations, power line transmission, transformers, and all electrical and medical devices have also increased correspondingly.

Corresponding author:
Roslan Umar
E-mail: roslan@unisza.edu.my
with growing number of users. Exposure to various NIR sources as shown in Table 1 including residential exposure to high voltage power lines, transformers, and domestic electrical installations, varies by duration and by distance from source. Exposure is usually to low frequency radiation (LF-EMR) or very low frequency (ELF-EMR) and continuous increasing among the population in the industrial world. Apart from LF-EMR and ELF-EMR radiation, individuals are increasingly vulnerable to radio frequency (RF) from television towers (TVs), radio stations, Wi-Fi phones or Wi-Fi systems, and personal computers with increasingly sophisticated technology.

Non-ionizing radiation also affects the children. Based on previous research, they have studied the childhood incidence leukemia as a function of the distance from the TV transmitter, there are increased risk of leukemia in children, living in radius less than 4 km compared to those living in radius 4 to 12 km. A study reported that absorbed microwave radiation (MWR) penetrated significantly to the brains of children aged 5 and 10 compared to the adult brain, in addition, children’s brain tissue absorbed two more MWR adult brain tissue. The children’s hippocampus and the hypothalamus absorbed 1.6-3.1 times higher and cerebellum absorbed MWR 2.5 times higher than adults, the children’s eye absorbed MWR higher than adults.

EF radiation also has negative effects on animals. One study has been done on a bee. Bees are endowed with magnetite clusters in the abdominal area, bee hives are exposed to 900MHz for 10 minutes. Immediately losing the hive natives, leaving only the queen bee, the eggs and some immature workers behind. With the navigation skills affected, the worker bees stopped coming to the hives for 10 days, which affected the production of eggs.

Because there is a growing issue, measuring, evaluating, EM field levels and controlling their compliance with standards or limit values has become more crucial. In this study, the main purposes are to measure the EF exposure around ILP to determine the highest level of exposure. Then the measured values will be compared with the limit set by ICNIRP and will be compared with the previous study.

**Table 1: Frequencies and Sources of Non-Ionizing Radiation**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Type of Radiation</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Hz–300 kHz</td>
<td>Low frequency to extremely low frequency (LF–ELF) electromagnetic radiation</td>
<td>Electrical fields of devices, conventional electrical network, video monitors, sections of AM radio</td>
</tr>
<tr>
<td>3 kHz–300 MHz</td>
<td>Radio frequencies (RF)</td>
<td>Sections of AM radio, FM radio, medical short-wave, nuclear magnetic resonance (NMR)</td>
</tr>
<tr>
<td>300MHz–300GHz</td>
<td>Microwave (MW)</td>
<td>Domestic microwave devices, mobile telephones, microwave for medical physical therapy, radar and other microwave communications</td>
</tr>
<tr>
<td>300GHz–780nm</td>
<td>Infrared (IR)</td>
<td>Solar light, heat and laser therapy devices</td>
</tr>
<tr>
<td>780nm–400nm</td>
<td>Visible light</td>
<td>Solar light, phototherapy, laser</td>
</tr>
<tr>
<td>400nm–100nm</td>
<td>Ultraviolet (UV)</td>
<td>Solar light, fluorescent tubes, food/air sterilization, radiotherapy, etc.</td>
</tr>
</tbody>
</table>

**Methodology**

**Site Selection:** In this study, measurement of EF strength took place at nearby Institute of Industrial Training (ILP) Gong Badak Kuala Nerus Terengganu. 26 points were selected and marked using Google Earth software. The location for measurement is chosen based on highly populated area where the public used to spend their activity and time.

**Data Collection:** The main equipment for this measurement is spectrum analyzer (Key Sight N99915A, USA). This equipment is capable to identify the level of ambient exposure at a wide range of frequency up to 9000 MHz and relevant instruments for high mobility and robustness. The omni-directional circular patch antennas were used in order to detect signal radiated from the ambient. The omni-directional antennas were connected to the low noise amplifier and the connected to the spectrum analyzer to reduce the background noise. The antennas were positioned in open area in order to receive the maximum radiation from the surrounding. Before the measurement carried out, the coordinate of
the points are recorded by using the Global Positioning System (GPS). The measurement of EF strength was performed for 10 minutes at selected point. The data of radiation in form of power level (dBmV) against frequencies (f) were recorded.

Data Analysis: After the measurement done, the data were extracted from the spectrum analyzer to computer. The data were saved in one file for each second, so there are plenty of files were created during the measurement. The files were then merged into one file using Anaconda software. The conversion stage took place where the raw data of dBmV were converted to V/m using the formula as shown in equation below:

$$V/m = (dBmV/20) \times 0.021f \times 1000$$  

where (dBmV/20) is the voltage amplitude received from the measurement, f is the frequency received during measurement in MHz. 0.021 is multiplication factor on leakage measurement with included the antenna factor of a resonant half-wave dipole.

The data obtained were analyzed to determine the highest data of EF strength. The spatial model of EF exposure using GIS software was then developed to get the map of exposure. The value of highest exposure was compared with the permitted limit recommended by ICNIRP and previous study for several locations around Malaysia.

Results and Discussion

From the obtained data, the EF strength against frequencies were plotted as shown in Figure 1. We can see that the peak detected at frequencies 2137.5 MHz, 1845MHz, 495MHz, 2835MHz and the highest peak is 25.05V/m at 2137.5 MHz as shown in Table 2. Based on Figure 1, there are four main highest value of EF strength which are at frequency of 2137.5 MHz which is 25.05 V/m, followed by frequency 1845MHz which is 22.89 V/m, at frequency 495MHz which is 13.74V/m and the lowest is at frequency 2835MHz which is 9.78V/m.

Table 2: Values of EF Strength at ILP

<table>
<thead>
<tr>
<th></th>
<th>Value of EF (V/m)</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest EF</td>
<td>25.05</td>
<td>2137.5</td>
</tr>
<tr>
<td>Average EF</td>
<td>5.54</td>
<td>945</td>
</tr>
<tr>
<td>Lowest EF</td>
<td>1.05</td>
<td>675</td>
</tr>
</tbody>
</table>

Figure 1: The Highest Electric Field Strength at ILP Area

From Figure 1, it can be seen that the EF strength value are varies at the different peaks. Each peak represents the different sources. It can be referred to the allocation spectrum plan guided by International Telecommunication Union (ITU) as shown in Table 3. The VHF and UHF frequency allocation for Malaysia are provided by Malaysian Communication and Multimedia Commission (MCMC), which contains radio frequency allocation for various wireless services in Malaysia as a pilot notes on limitation when using the frequency between 9 kHz to 420 THz. It is divided into frequency bands and specifies the general purposes for which the bands may be used. Based on ITU, it is found that the highest values of EF strength were contributed from the Cellular Mobile Services and Mobile broadcasting. GSM1800 and 3G base station tower were found as the main influencers to NIR exposure levels.

In addition, the 1800 bands are more used in densely populated areas.

Figure 2 shows the comparison of EF strength against international limit ICNIR. The highest limit of ICNIR limit is 61 V/m. Meanwhile, the highest peak is 25.05V/m. We can see that the values of exposure almost 50% of the limit but the values are still below the limit.

Figure 2: The Comparison of Electric Field Strength at ILP Area with ICNIRP Limit
Figure 3 shows the comparison between EF strength with previous study. This study, ILP was compared between the UniSZA Gong Badak, IIUM and UMT.

This comparison recorded the different values of EF strength between campuses around Malaysia. However, the trends show that the exposure is quite high where the exposure are around 50% off the limit. This might be due to the instruments used, the population density, and the location criteria\textsuperscript{12}. The IIUM recorded the highest reading of exposure which is 38.44 V/m, followed by UMT which is 37.82 V/m. According to previous study, the population density might influence the value of exposure. ILP shows quite high exposure which is 25.06 V/m possibly also due to the population density, where there are student’s hostels and residential area nearby. The ILP is located nearby in industrial area, where we already known that they may operate heavy machinery or electrical appliances with high voltage usage. In addition, there are also other surroundings factors that can affect the NIR exposure level of an area such as mobile phone users, construction or moving vehicles\textsuperscript{11}. Mobile telecommunication were existed in all environments together with radio broadcasting\textsuperscript{13-15}. The installation of base station nearby also one of the factor that suspected causing stronger exposure due to the layering of the antenna radius patterns\textsuperscript{12}. As in the other telecommunication antennas, the energy from a cellular phone antenna is directed toward the horizons that are parallel to the ground, with some downward scatter. Base station antennas use higher power levels compare to the other types of land-mobile antenna\textsuperscript{16}.

### Table 3: VHF and UHF Band Usage in Malaysia\textsuperscript{2,11}

<table>
<thead>
<tr>
<th>Services</th>
<th>Frequency Band (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautical, radiolocation</td>
<td>Aeronautical</td>
</tr>
<tr>
<td></td>
<td>Radiolocation</td>
</tr>
<tr>
<td>Broadcasting</td>
<td>FM Radio</td>
</tr>
<tr>
<td></td>
<td>VHF TV</td>
</tr>
<tr>
<td></td>
<td>UHF Mobile</td>
</tr>
<tr>
<td></td>
<td>UHF TV</td>
</tr>
<tr>
<td>Trunked Radio</td>
<td>Digital</td>
</tr>
<tr>
<td></td>
<td>Analog</td>
</tr>
<tr>
<td>TM CDMA/FWA</td>
<td>TM CDMA</td>
</tr>
<tr>
<td></td>
<td>BWA+TM FWA</td>
</tr>
<tr>
<td>Cellular Mobile Services</td>
<td>GSM 900</td>
</tr>
<tr>
<td></td>
<td>GSM 1800</td>
</tr>
<tr>
<td></td>
<td>3G</td>
</tr>
<tr>
<td>Private Network</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Amateur Radio</td>
<td></td>
</tr>
<tr>
<td>Maritime</td>
<td></td>
</tr>
<tr>
<td>WiMAX</td>
<td></td>
</tr>
<tr>
<td>WiFi</td>
<td></td>
</tr>
</tbody>
</table>
**Conclusion**

Non-ionizing radiation may affect human life in the long term. Measuring and evaluating EM field levels has become an important agenda to make sure their compliance with the standards limit set by ICNIRP and thus contribute to the health monitoring action for public NIR exposure. After thorough analysis and evaluation of the radio frequency radiation, it can be said that the exposure levels at Gong Badak, especially nearby ILP are well below the limits set by ICNIRP. The high exposure pattern among campuses (even though the value is not exceed the limit) is somewhat worrying. Future measurement should be conducted to make sure the exposure would not increase further.

**Acknowledgement:** This study is made possible by the usage of the grants FRGS/1/2015/SG02/UNISZA/02/1 and Special thanks are also devoted to other researchers of Electromagnetic Research Group (EMRG) for their aid in this work.

**Ethical Clearance:** Nil

**Source of Funding:** University

**Conflict of Interest:** Nil

**References**


Mental Health Mediate Social Support to Predict Quality of Life among Drug-Abuse Inmates

Fazida Karim¹, Mahadzirah Mohamad¹, Norhilmi Muhammad¹
¹Lecturer, Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia

Abstract

This study examined mental health as a mediator between social support and Quality of Life (QoL). Survey data from 451 drug-abuse inmates were analyzed using structural equation modeling. Results indicated that mental health partially mediate social support to predict QoL. These findings suggest not only that it is important to consider social support in understanding QoL, but also that mental health plays an important role in these relationships. Implications for these more complex relations are discussed for further research.

Keywords: Inmate, Support, Health, Quality of life

Introduction

Drug abuse has become the leading malignancy in worldwide¹. In United States, 66% of prison inmates were related to drug crimes roughly², and about 60% of drug-abuse inmates were charged in Malaysian prisons³. Studies have indicated that drug-abuse inmates facing with low QoL in comparison with other populations⁴. Previous finding shows that lacking in personal success such as social support and mental health can significantly impair QoL outcomes⁵,⁶.

Social support refers to the various types of free assistance from family, friends and significant others⁷. The literature indicates that social support systems are very important protective factors for individuals experiencing stressful events⁸ and that protective factors are necessary for better life⁹. Social support plays a critical role in mental health and QoL⁹. It has been reported that social support can improve the negative mental health on an individual’s well-being⁹.

Mental health is an ability of individuals to cope successfully with significant change that create a balance between life activities⁹. Several researchers report that drug-abuse inmates have significantly different levels of QoL, which may be due to varying levels of mental health¹⁰ Mental health affects many aspects of QoL, and positive mental health have significantly better QoL¹⁰. However, little is known about how mental health affects QoL, especially for drug-abuse inmates in Malaysian prisons.

Specifically for drug-abuse inmates, positive mental health has been considered to be a defense mechanism to deal with treatment-related difficulties, for example, emotional and social stressors¹¹. Stronger mental health has been associated with psychological well-being in inmates. Additionally, mental health has also been examined as a potential mediator related to an individual’s QoL outcome¹¹.

Despite, mental health and social support became crucial and important factors to predict the different aspects of QoL based on drug-abuse inmates’ perceptions. Thus, this study hypothesized that mental health play an important mediator in the relationship between social support and QoL. A framework diagram is shown in Figure 1.

Corresponding author:
Mahadzirah Mohamad
E-mail: mahadzirahmd@unisza.edu.my
Therefore, this study aimed to determine the role of mental health as mediator to predict social support on QoL.

**Methodology**

**Participants:** The sample of current research was the drug-abuse inmates of nine Peninsular Malaysia Prisons. 551 questionnaires were distributed among inmates using a simple random-sampling. The 451 of the inmates returned the questionnaires. In this regard, response rate was 81.85%.

**Instruments:** This study adapted instrument of Multidimensional Scale of Perceived Social Support (MSPSS) consisting 12 items. While, Short-Form 12 (SF-12) was applied to measure mental health with 12 items. Maqasid Shariah Quality of Life instrument was adopted for QoL. This study used scale 1 = strongly disagree to 10 = strongly.

**Statistical Analysis:** This study applied descriptive analysis and Exploratory Factor Analysis (EFA) using SPSS 21.0. While, AMOS 21.0 was for Confirmatory Factor Analysis.

**Results and Analysis**

**Demographic Profile:** Majority of respondents were male drug-abuse inmates (58.3%) and were single (50.3%). The respondents averagely in age of 26 - 40 years old. 66.2% of them were contract worker and self-employed. Most of them had received monthly income of RM1000 to RM2000 (45%). The finding shows that 75% of them got involved in drug-abuse incidents since ages of 13 to 25 years.

**Measurement Model:** All constructs shown in measurement model were measured for validity and reliability using confirmatory factor analysis (CFA). The validated measurement model of the constructs and the value of factor loading illustrated in Figure 2 and Table 1. The constructs with factor loadings greater than 0.6 have achieved the unidimensionality requirement. Finding also indicated the model have achieved the requirement of construct validity. Composite reliability with greater than 0.6 is required. While, convergent validity with value greater than 0.5 was measured using AVE. The results in Table 1 (QoL), Table 2 (mental health) and Table 3 (social support) recommend the reliability and validity requirement were achieved. Finally, the discriminant validity was measured using discriminant validity index.
Table 1: Quality of Life

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Construct</th>
<th>Factor Loading</th>
<th>AVE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Religion</td>
<td></td>
<td>0.433</td>
<td>0.732</td>
<td>0.931</td>
</tr>
<tr>
<td>Life</td>
<td></td>
<td>0.934</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mind</td>
<td></td>
<td>0.944</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lineage</td>
<td></td>
<td>0.931</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property</td>
<td></td>
<td>0.912</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Mental Health

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Construct</th>
<th>Factor Loading</th>
<th>AVE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Health</td>
<td>a) focus (MH1)</td>
<td>0.870</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) calm (MH2)</td>
<td>0.942</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) peace (MH3)</td>
<td>0.931</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) happy (MH4)</td>
<td>0.862</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discriminant validity index summary was applied to gauge the construct to be different from other constructs\textsuperscript{26-27}. The results (Table 4) suggested discriminant validity for all constructs achieved.

Table 3: Social Support

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Construct</th>
<th>Factor Loading</th>
<th>AVE</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Support</td>
<td></td>
<td>0.531</td>
<td>0.774</td>
<td></td>
</tr>
<tr>
<td>a) Friends</td>
<td></td>
<td>0.854</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Significant others</td>
<td></td>
<td>0.710</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Family</td>
<td></td>
<td>0.602</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: The Discriminant Validity

<table>
<thead>
<tr>
<th>Construct</th>
<th>Discriminant Validity</th>
<th>Social Support</th>
<th>Mental Health</th>
<th>QoL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Support</td>
<td></td>
<td>0.733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health</td>
<td></td>
<td>0.393</td>
<td>0.901</td>
<td></td>
</tr>
<tr>
<td>QoL</td>
<td></td>
<td>0.712</td>
<td>0.444</td>
<td>0.855</td>
</tr>
</tbody>
</table>

Structural Equation Modelling (SEM): SEM was performed to check the relationship in hypotheses. Figure 3 showed that the model achieved adequate level based on the required fit indices (CFI = 0.933, TLI = 0.928, Chisq/df = 2.131, and RMSEA = 0.050.).

Figure 3: The Structural Model
The finding shows that H1, H2 and H3 in Table 5 were statistically supported.

**Table 5: The Regression and Significance Value**

<table>
<thead>
<tr>
<th>Construct</th>
<th>Estimate</th>
<th>SE</th>
<th>CR</th>
<th>P-Value</th>
<th>H</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS→MH</td>
<td>0.453</td>
<td>0.076</td>
<td>6.869</td>
<td>0.001</td>
<td>H1</td>
<td>V+</td>
</tr>
<tr>
<td>SS→QoL</td>
<td>0.611</td>
<td>0.050</td>
<td>3.923</td>
<td>0.001</td>
<td>H2</td>
<td>V+</td>
</tr>
<tr>
<td>MH→QoL</td>
<td>0.146</td>
<td>0.067</td>
<td>9.000</td>
<td>0.001</td>
<td>H3</td>
<td>V+</td>
</tr>
</tbody>
</table>

**Mediation:** The mediation was performed to support H4. Statistically found mental health is a partially mediated social support on QoL (lower bound= 0.0344, upper bound = 0.1231). This study applied bootstrapping to check mediations effects. Thus, it demonstrates when upper and lower bound did not include zero, there is mediation occurred. H4 shows partial mediation happened as the direct effect and indirect effect were significant (β=0.620, p-value = 0.002, β=0.06, p-value = 0.001).

**Discussion**

The objectives of this study was to model a relationship among social support, mental health and QoL. Furthermore, the research was performed to find the role of mental health as mediator on to social support on QoL. The result showed that social support had positive effect on mental health and QoL. The result of social support in a form of friend have more influence as compared to significant others and family. In contrast, family have fewer impact in clarifying the respondents’ mental health and QoL.

In addition, the result show that mental health effect QoL positively. Mental health mediate support group to help individuals to accomplish to live successfully. Moreover, when a state of peace appeared in drug abuser’s mind they begin to recover their life by focusing on five aspects in QoL.

**Conclusion**

The research shows that most of drug-abuse inmates facing a poor QoL. The aim of this study was to assist drug-abuse inmates to reback into the society successfully. Thus, it is important to model a relationship of social support, mental health, and QoL.

Moreover, the most important aspect in QoL to be improved is property. In other words, inmates are very concern on employment matters upon release from prison. The aspect of friends, significant others, and family in social support would provide sources of support such as emotional, informational and appraisal support. The study suggested having good mental health reflect to better QoL.

This study has contributed to body of knowledge in terms of development of new model of social support, mental health, and QoL. In addition, mental health act as mediator in the context of drug-abuse inmates add a new knowledge in mental health literature. At managerial implication, this study helps prisons department to understand background of inmate through aspect of QoL to be improved. The information also assists the management to improve programme or policy.

**Ethical Clearance:** Nil

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**


22(5): 305-315.


Freshwater Governance on Limboto Lake in Gorontalo Province of Indonesia

Achmad Rizal¹, Subiyanto², Hafizan Juahir³, Fathurrahman Lananan³

¹Lecturer, Socio-Economic Studies Center for Fisheries, Faculty of Fishery and Marine Science, Universitas Padjadjaran, 45363 Sumedang, West Java, Indonesia; ²Lecturer, Department of Marine Science, Faculty of Fishery and Marine Science, Universitas Padjadjaran, 45363 Sumedang, West Java, Indonesia; ³Lecturer, East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin, 21300 Kuala Nerus, Terengganu, Malaysia

Abstract

This study investigates the nature of governance system around Limboto Lake and its impact on the conservation of the freshwater resources. It also seeks to understand the structural process and contribution of local knowledge in freshwater conservation, which is a gap identified in freshwater governance. Data was based on residents’ impact and institutions involved in collation, formulation and implementation of freshwater policy. Based on the findings there is a unanimous indication that, locals are not part of freshwater governance at Limboto Lake and this finding has nothing to do with their educational background. This renders the system of governance as a top-bottom approach. Indications are that this system does not support the conservation of the Lake considering the apathy in adhering to rules and regulation by the locals. The locals believe that their contributions and participation would help strengthen capacities of knowledge and practices in freshwater governance to reduce degradation.

Keywords: Freshwater governance, Local knowledge, Conservation, Perception

Introduction

Water scarcity is a severe global problem; billions of people experience water scarcity at least parts of the year¹. Water shortage is common at remote rural areas, for example on islands². Industries and energy production may depend on a vast amount of clean water. Access to clean water is at the heart of sustainable development - inducing social, economic and environmental growth³. The United Nation’s goal for access to freshwater, described in the 2030 Agenda for Sustainable Development, is to “ensure availability and sustainable management of water and sanitation for all”²⁴-⁵.

There is increasing global need to improve the crisis in freshwater governance (FWG)⁶-⁷, which is the major threat to freshwater degradation⁸-⁹. Freshwater governance is describes
are likely to be affected by or can affect the resources.

Even though considerable efforts have been made towards the conservation of freshwater resources, the trade-offs between man and the freshwater resource needs are increasing all over the world. This is because unregulated human activities around freshwater resources are increasing and leading to their degradation.

The study examined the institutions and structures that govern the use of Limboto Lake, as a common resource. In addition, the research investigated relevance of government rules guarding the lake, aimed at the perception of the differences in the educational level of local communities from the two districts around Limboto Lake. The rationale for the study was based on the fact that understanding local concerns within a resource-context would provide the dearth of information for policy formulation and implementation towards freshwater conservation.

The analysis was on how relevant current state of governance in terms of data collected, formulation, implementation and enforcement of water laws and practices are towards networking and relationship amongst freshwater stakeholders. The results were consistent and do imply that majority of the respondents believe that government’s rules are ineffective in protecting the lake based on its top-down approach.

**Study Area:** Limboto Lake is a natural resource located in Gorontalo province. Its presence plays a vital part in supporting the lives of the society as well as the organisms living in the lake. This leads to an aligned and balanced environment for the ecosystem native to Gorontalo province. However, due to the siltation of the lake, the Limboto Lake loses its function to maintain the balance of the environment within the area. A number of recent studies report that the lake is in its critical status. Since 1934, sedimentation and the trend to open farming sites or to build houses decreased the area and the depth of the lake; from ±7000 ha with 14 meters depth to ±3000 ha with the depth of 2.5 - 4m.

The community nearby the Limboto lake riverbank, i.e. farmers, traditional fishermen or small-scale fisheries, and other citizen are prone to the issues of economic, social, and resources related to the poor lake environment. This circumstance forces the people to be able to manage their income from resources around Limboto Lake.

**Methodology**

With a population of 17,783, a targeted population of 9,702 was determined using available figures provided by the Indonesia Statistical Service based on the communities immediately surrounding the Limboto Lake in the Gorontalo town and Gorontalo Districts. A sampling size of 354 respondents was determined, using the Krejice and Morgan sampling size methodology.

A multi-staged sampling was used for the selection of respondents. The data was collected through a questionnaire which was administered verbally by six research students and the researcher. Semi-structured questionnaires and well-structured interview schedule were administered mainly to the local leaders during an in-depth interview. Educational Attributes of the respondents interacted with are shown in Table 1. Age distribution of the respondents is also shown in the Figure 1.

**Table 1: Educational Background of Respondents**

| No formal education | 67 | 18.9 | 18.9 | 18.9 |
| SD (Elementary) | 58 | 16.4 | 16.4 | 35.3 |
| SMP/Junior High School (JHS) | 107 | 30.2 | 30.2 | 65.5 |
| SMP + Technical Course (MSLC) | 86 | 24.3 | 24.3 | 89.8 |
| SMA/Senior High School (SHS) | 18 | 5.1 | 5.1 | 94.9 |
| Tertiary | 16 | 4.5 | 4.5 | 99.4 |
| N/A | 2 | 0.6 | 0.6 | 100.0 |
| Total | 354 | 100.0 | 100.0 |
Results and Discussion

Relevance of Current Freshwater Governance:
Responses to the perception of respondent are presented in Figure 2 based on local community level of education. Responses by those with SHS level of education with reference to “Yes”, government rules are working and “No” it is not working, does not show any significant differences. Yet, there is a unanimous affirmation that government rules and regulations are not helping to reduce the degradation of the Limboto Lake. The majority of respondent 74 percent with the “No” decision were JHS level graduates, followed by MSLC level graduate with 71 percent. The least respondents who were not sure were 7 percent with MSLC level of education.

Using the Pearson Chi-square as an indicator with a Cramér’s V of 0.2 and a Pr of 0.025. Indications are that the differences in the responses have weak relationship, therefore the responses are not dependent on their level of education. This result is confirmed through observation of human activities around the lake that impacts on the lake. Evidence from Plates, 1, 2 and 3, show unregulated human activities around freshwater resources. This gives indications of weak institutional governance where locals do not adhere to rules and regulations.

There is a nexus between the aspirations of the local communities and the aim of protecting and conserving the lake as a sustainable resource. According to a male respondent, enforcement of rules and regulations are in the hands of the government, yet within the communities there is no one to ensure that the right practice is adhered to. Another female respondent indicated that the chiefs, who can help to enforce these laws are not respected by the government officials.

This is because their authority to enforce certain laws has been taken away by the district assembly officials who do not live in the communities around the lake and therefore do not even understand their plight.

Perception of Policy Formulation and Implementations: On the issue of stakeholders’ perception of governance with respect to government’s policy formulation, one of the facilitators for policy formulation said:

“Sometimes the key stakeholders or local communities, are not involved in policy formulation. It is better to involve them so that they would own it. Broad stakeholder’s consultation is the best option”

Ownership and Control of Limboto Lake:
Perception of respondents on who has ownership and therefore has the authority to make rules and control practices around the lake is shown in Table 2. A cross tabulation of the ownership of the lake and control of the lake shows that majority (n=183, 51.7%) of the respondents believed that Local wisdom who is the king of rule owned the lake and therefore has the right to make rules and control issues around the Lake. Another significant number of respondents indicated that God controlled the lake (n=83, 23.4%). There was significant dependence on the control and ownership of the lake as shown in Table 2 and based on Table 3 of the Chi-square analysis.
Table 2: Who Has the Right to Make Rules and Control the Lake?

<table>
<thead>
<tr>
<th></th>
<th>Local Wisdom</th>
<th>Gov't</th>
<th>God</th>
<th>Everyone</th>
<th>Nobody</th>
<th>N/A</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who owns the lake?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Wisdom</td>
<td>Count</td>
<td>183</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>51.7%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>0.6%</td>
<td>0.0%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Gov't</td>
<td>Count</td>
<td>8</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>2.3%</td>
<td>1.1%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>God</td>
<td>Count</td>
<td>83</td>
<td>5</td>
<td>15</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>23.4%</td>
<td>1.4%</td>
<td>4.2%</td>
<td>1.7%</td>
<td>0.8%</td>
<td>31.6%</td>
</tr>
<tr>
<td>All of us</td>
<td>Count</td>
<td>17</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>4.8%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.8%</td>
<td>0.0%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Nobody</td>
<td>Count</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>3.4%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.3%</td>
<td>0.0%</td>
<td>3.7%</td>
</tr>
<tr>
<td>N/A</td>
<td>Count</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.6%</td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>Count</td>
<td>303</td>
<td>15</td>
<td>17</td>
<td>7</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>% of Total</td>
<td></td>
<td>85.6%</td>
<td>4.2%</td>
<td>4.8%</td>
<td>2.0%</td>
<td>2.8%</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Table 3: Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-Sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>4.3252a</td>
<td>25</td>
<td>.000*</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>95.09</td>
<td>25</td>
<td>.000*</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>354</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Community Involvement in Making Rules and Managing the Lake

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very much</td>
<td>1</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Sometimes</td>
<td>27</td>
<td>7.6</td>
<td>7.9</td>
</tr>
<tr>
<td>Not really</td>
<td>76</td>
<td>21.5</td>
<td>29.4</td>
</tr>
<tr>
<td>Not at all</td>
<td>248</td>
<td>70.1</td>
<td>99.4</td>
</tr>
<tr>
<td>Neutral</td>
<td>2</td>
<td>0.6</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>354</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

There is association between Ownership and the person who controls the Limboto Lake (Table 4). This was evident from the Pearson chi-square results of \( \chi^2 = 4.3252a, \ df=25, \ p=0.000 \). Government’s authority to enforce rules and regulations is not strong since the respondents do not recognise the control of government and its officials around Limboto Lake.

In addition, there is a clear lack of distinction or collaboration between local traditional governance and formal institutional governance. This makes it uncertain as to “who” has the right to formulate and implement rules, as well as whose rules and regulations should be enforced and by whom.

Another dilemma observed was if the traditional authorities (TAs) who are in the locality own the Lake, then it would not be in wrong for government to impose its rules. To ensure enforcement of rules, there should be a collaboration in the area on data gathering for the formulation and implementation of rules and regulations.

The respondents explained that the chiefs and priests have better ways of presenting stringent rules that
attract strict measures for not adhering to rules, yet all these systems have broken down due to the inception of the western system of governance which puts authority in the hands of the government. Analysis of the data presented in Table 2 confirms this assertion. Indications are that they are not involved in making rules or in the management of the lake.

The situation around the Lake also depicts how current government institutions have shaped the behavior of individual members and produced the chain of apathy around Limboto Lake. This is because the people perceive that, the ancestors (local wisdom) is supposed to own and control the lake with his own set of customary rules, well understood by the people in the community.

Conclusion

Indications are that locals do not have a good grasp of some of the rules and their implications on the lake and their livelihood. Here, their participation in the rules, principles, values, policies and laws which provide the bases for strengths and weaknesses of governance is not properly in place signifying a weak institutional system23,19. The opportunity to participate and contribute their knowledge to policy is thus lost. There is a signal that there are inadequacies in the dearth of information for policy formulation and implementation towards freshwater governance, confirming17-18,24-25. There was no mention of any institution or the collection of information on social, anthropogenic and cultural issues pertaining to the catchment area that could impact on the freshwater resources. This is a clear indication of top-down, stewardship style of governance and not the stakeholder approach as the current integrated system of governance on paper26. There is a gap identified in freshwater governance. This would inform freshwater stakeholder’s knowledge in freshwater governance at Limboto Lake. The data will contribute to knowledge on the use of local ideas and practical solutions to control the degradation of freshwater resources. Furthermore, it would help strengthen capacities of local knowledge and practices to be effectively used in freshwater policy formulation, enforcement and management.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

References

Non-Ionizing Radiation Measurement around Four Different Selected Areas

Khairul Anwar Rosley¹, Nor Hazmin Sabri¹, Roslan Umar², Nurul Syafiqah Hasshim², Roha Tukimin³, Shamesh Raj A/L Parthasarathy³

¹Lecturer, School of Fundamental Science Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia; ²Lecturer, East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin Gong Badak Campus, 21300 Kuala Nerus, Terengganu Malaysia; ³Lecturer, Radiation Safety and Health Division, Malaysia Nuclear Agency, Bangi, 43000 Kajang, Selangor, Malaysia

Abstract

Telecommunication is the most demanding services nowadays. The increasing demands toward technologies especially in cellular phones, computers, electronic gadgets and other electrical appliances lead to the increase of non-ionizing radiation (NIR) exposure. This kind of exposure may harmful to living things based on previous research findings. This study aims to measure the electric field (EF) strength around several selected areas and compared the obtained value with the international standard recommended by ICNIRP. The measurement was conducted using Spectrum Analyzer which connects to two circular patch antenna which can detect frequencies up to 3 GHz. The coordinates of the selected sites were recorded by Global Positioning System (GPS) and the measurement were conducted for 10 minutes for each point. The obtained values of each area show that each area values still under the limit recommended by ICNIRP. However, some area shows high exposure especially at denser populated area. All these data can be used as a reference for further study and as a guide for the Ministry of Health Malaysia to proposed guidelines of the usage of technology in our daily life for public concern.

Keywords: non-ionizing radiation, EM exposure, Electric field strength, Radiation protection

Introduction

Human daily life always exposed to the same type of non-ionizing radiation source. Electrical and electronic hardware for examples cordless phones, microwaves, computers, televisions and others can produce non-ionizing radiation¹. Electromagnetic field (EMF) energy is energy that created from the electric and magnetic field. Electric and magnetic fields are an unobservable area of energy that referred to as radiation either non-ionizing or ionizing radiation which indicated by wavelength and frequency². This EMF created by any wiring or hardware that conveying electric current³. The increasing demands toward technologies especially in cellular phones, computers, electronic gadgets and other electrical appliances lead to the increase of non-ionizing radiation (NIR) exposure. The exposure to electromagnetic fields could lead to changes in body tissues, which can promote harm to the body. Exposure can cause harm depending upon an assumption from an increment of temperature above a certain range, which causes a thermal effect happens¹. Thermal effect specifically happened from tissue heating due to the infusion of EMF in dissipative medium and non-thermal effect not accompanying with the increase of temperature. Temperature distribution patterns within the tissue depend on tissue permeability⁴. Previous study reported that the radiation exposure level around the selected based station in Kuala Nerus is far below the ICBIRP standard limit². The observation had been done based on the distance between the based station with a selected point where distances were set up at 15 m, 50 m, 100 m, 150 m, 200 m, 250 m, 300 m, 350 m, 400 m and 450 m from the BST. They found that the exposure level

Corresponding author:
Nor Hazmin Sabri
E-mail: norhazmin@umt.edu.my
values are somewhat worrying where in some locations the value is more than 50% off the limit is far below the ICNIRP standard limit. The main scope of this study is to measure the ambient public NIR exposure around several selected areas with different population interest by using Spectrum Analyzer that connects to two circular patch antenna, which enables to capture frequencies up to 3 GHz. The observed values are then compared with the international standard recommended by ICNIRP to ensure the limit is not exceeded. By leading this study, the data can be used to monitor the exposure value of Malaysia for public health concern. The guidelines on the usage of technology should be developed for safety and the awareness program should be conducted to educate people in the non-ionizing radiation.

Methodology

In this study, four different areas were measured by using Spectrum Analyzer (keysight N9915A) connected to two circular patch antenna (Figure 1). These antennas were raised about 1.5 meters from the ground by using plastic fibre tripod stand to prevent any reflection from the ground\(^5\) (Figure 2).

The spectrum analyzer is ready to discover the extent of measurable strength at wide selection of frequency up to 9000 MHz and acceptable instrument for prime quality and lustiness. The antenna that used to notice and capture signals that radiates in ambient was an omnidirectional circular patch antenna that had been invented specifically for this study. The observation areas are selected randomly around Kuala Nerus and Bachok. The points were marked using Google Earth where the selection based on it accessibility to conduct the measurement, anthropogenic factor such as residential, commercial or plantation area, nearby base station and public places. The coordinates of each points were recorded by using Global Positioning System (GPS) (Figure 3) when the measurement was taken.

The measurement was conducted for 10 minutes for each points and the data were taken in the time interval of one second. All collected data was then managed and analyzed by using Microsoft Excel. The obtained data was then converted from power level in the unit of dBmV to EF strength in the unit of V/m. the detected exposure value was compared with ICNIRP standard limit provided\(^6\). The Electric Field strength (V/m) versus Frequencies (\(f\)) graph has been plotted to see the NIR source contributing to the exposure reading and to determine how high the value off the limit.

Results and Discussion

The NIR exposure exist everywhere, even though one did not have mobile phone or electronic gadget. Most of the people assume that the radiation come from this popular technology nowadays, but in fact the radiation comes from anything related to electricity,
electronics devices, electric appliances and wireless telecommunication technology around us which we cannot avoid it.

From the data obtained, the EF strength was plotted against frequency to determine the EF peak of each area. The measurements were taken during the day and pleasant weather around 9 am to 5 pm. The strength of EF around these locations are as shown in Figure 1 and their maximum and average values of each area are shown in Table 1 and 2. There are three different analyses will be discussed in this study. First, to observe the trend of exposure level around each area. Second, to determine the highest EF strength value of each area and its frequency sourced from the surrounding. Lastly to compare the obtained values with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines.

From Figure 5-6, each graph shows that the peak of EF strength were exist starting from 675 MHz, 945 MHz, 1845 MHz and 2860 MHz. From Figure 1, the highest EF value recorded at Teluk Ketapang is 0.073 V/m at frequency of 1848 MHz while the average value recorded around 0.0023 V/m. At Bachok, the highest EF value is 37.251 V/m at frequency 1845 MHz while the average value for this area is around 1.909 V/m. From Figure 6, Sultan Mahmud Airport recorded the value of 0.583 V/m at frequency 2140 MHz while the average value around 0.034 V/m. The highest value recorded at Bukit Tunggal is 0.499 V/m at frequency 2140 MHz, the same source of frequency as in Figure 5 while the average value of this area around 0.020 V/m.

From this findings, it shows that the highest EF strength between these four area belong to Bachok area where the value is 37.251 V/m. this possibly due to the stranded land area. The EF emitted from nearby base station directly captured by antenna. The number of scatters may be small and the magnitudes of the individual scattered components can vary with line-of-sight paths being common. The effect of these conditions is to cause the fast fading signal. Therefore, the transmitter power would be unnecessarily high due to the possibly leading to interference problems.

The expected data around Sultan Mahmud Airport is supposed to be higher than other places due to its communication between control tower and the plane. However, the obtained data shows the opposite. This may be because it just a small airport and there was no flight standby for take off or landing at the time the measurement was taken.

Data obtained from Figure 4 and 7 which both classified as residential area show a drastic difference. The EF value and average EF value from Figure 7 which in Bukit Tunggal area is higher compared to data from Figure 4 which in Teluk Ketapang Village area. This happen due to the presence of base station telecommunication tower at Bukit Tunggal area. Location of base station in Teluk Ketapang Village quite far from the measurement site if compared with in Bukit Tunggal area. Thus, one of the factors why the obtained data shows a drastic difference.

The VHF and UHF frequency allocation for Malaysia spectrum plan is developed by the Malaysian Communication and Multimedia Commission (MCMC).
The plan is a report that contains radio frequency distribution for various wireless service in Malaysia as a pilot notes on impediment when utilizing the frequency. The Spectrum Plan designates the range in Malaysia between 9 kHz to 420 THz and is divided into frequency bands and indicates the general purposes for which the bands might be utilized. This range plan is utilized as a guide for the researcher. Based on the spectrum plan table, the highest EF strength around these four areas is contributed by the cellular mobile services, which is 3G and GSM1800. GSM1800 and 3G base station tower were found as the fundamental influencers to NIR exposure levels. Figure 8 shows the comparison between the obtained value of each area with the permitted limit recommended by the ICNIRP. The values obtained from the observation for each area still under the limit recommended.

**Figure 8: Comparison of Electric Field Strength of All Areas with ICNIRP Limit**

**Conclusion**

The measurement of Electromagnetic Field strength has been conducted in four different selected areas in East Coast Malaysia. The highest EF strength recorded among these four areas is in Bachok, Kelantan. All measured values are compared with International Commission on Non-Ionizing Radiation Protection (ICNIRP) recommended for safety guidelines. The compared values show that the exposure level around all selected areas are still under the ICNIRP recommended limit. The measured values can be influenced by a few factors such as the present of base station in observe area, the population density in residential area lead to the high EF strength value. Moreover, stranded land also lead to high EF strength due to the line-of-sight phenomena happens causes the antenna to directly capture the signal. Therefore, it is highly recommended to measure the radiation exposure level especially around a residential area in Malaysia. This will help the government especially the Ministry of Health Malaysia to monitor and investigate the radiation trend and plan any precaution or prevention to overcome this problem.

**Acknowledgement:** This study is made possible by the usage of grant FRGS/1/2015/SG02/UNISZA/02/1, TPM 68006/2016/79 and UMT 68006/INSENTIF/60. The authors also thank to Universiti Malaysia Terengganu, Universiti Sultan Zainal Abidin and Universiti Teknologi MARA for the facilities provided.

**Ethical Clearance:** Nil

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**


In Facing the Challenges of Islamic-Based Social Development through Mental Health Wellbeing

Siti Nur Aafifah Hashim¹, Wan Norhaniza Wan Hasan²

¹PhD Candidate, Centre for Islamic Development Management Study (ISDEV), Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia; ²Lecturer, Centre for Islamic Development Management Study (ISDEV), Universiti Sains Malaysia, 11800 Pulau Pinang, Malaysia

Abstract

The globalised era causes a great impact to human and become the core for development. However, the demands of economic development and progress led to humans being burdened hence results in mental health issues. Consequently, the emergence of moral issues caused by this neglect of mental wellbeing. This phenomenon has negative effect on the implementation of Islamic-based social development. Based on these matters, few questions are raised. First, what is the concept of mental health prompt to Islamic-based social development? Second, how mental health able to affect the process in realisation of Islamic-based social development? Grounded on these issues, this paper intends to analyse the concept of mental health wellbeing from the Islamic perspectives and propose strategies in facing social development challenges of today with special regard to Islamic-based social development accordingly. Study conducted on literatures related to mental health shows differences between the concept of mental health according to the conventionally mainstream perspectives and Islamic perspectives. Therefore, different strategies are needed if the objective that wants to be achieved is the goal of Islamic-based social development: the pleasure of Allah (God).

Keywords: Mental health, Social development, Islamic-based social development, Social development strategy

Introduction

Economic growth is accepted commonly as a prerequisite to develop a nation. However, a sturdy economy alone does not ensure a holistic wellbeing of a community or society. Therefore, a comprehensive framework for development is needed. To achieve this, economic growth must be balanced with social development and progress. At par with the increasingly expanding economic development, it is undeniable that mental health issues become the interest of many parties due to alarming statistics related to it.

World Health Organization (WHO) recorded suicide rate close to reach a million people every year. They found that the global rate for suicidal has increased to 60% compared to 45% in 2017¹. Some countries recorded the highest suicide rate among people aged 15 – 44 years old and while some other countries has it within the age of 10 – 24 years. However, these figures only recorded loss of lives with no suicide attempts included. WHO indicates that for every adult who died by suicide there may have been more than 20 others attempting suicide¹. The study carried out by this international organisation finds that the root cause for suicide is due to weak mental health condition results by extreme mental issues such as depression, stress, personality disorders, schizophrenia and alcoholism (substance abuse).

The global trend of mental issues has also taken place in Malaysia. The National Health and Morbidity Survey in 2015 estimated that 1 for every 3 adults aged 16 years and above faced issues related to mental health with the prevalent value of 29.2%. This value is a double increase compared to the prevalence for the past ten years with 10.6% in 1996 and 11.2% in 2006. The survey also finds that there has been the highest prevalence of mental health amongst adolescents aged 16 to 19 and

Corresponding author:
Siti Nur Aafifah Hashim
E-mail: aafifahhashim16@gmail.com
These findings show the society has become pressured to sustain their economic stability. This is especially befallen amongst adolescents who need to work hard to achieve success in academic, career and personal life. Based on the Depression, Anxiety and Stress Scales (DASS-21) conducted in National Health and Morbidity Survey 2017, anxiety is the most relatable issue among Malaysia young generation as shown in Figure 1.

Figure 1: State of Adolescents' Mental Health in Malaysia Based on DASS-21 Scoring

As the effect, a lot of individuals experience stress, worry, low self-appreciation, role conflict, and value also emotional and interpersonal problems. A human cannot escape from stress, depression and anxiety especially when dealing with hardships of life interactions with other people or how one leads his or her life. However, the increasing rate of mental health might influence negatively to the success of development. This is because one’s mental health effects one’s work productivity and their capability to contribute to the society.

Additionally, mental health also influences national economic and social developments. Failure in safeguarding mental wellbeing can lead to many social issues, among which are crime and substance abuse that also leave a negative impact to the overall process of national development. Following these issues, this paper intends to look more closely into mental healthcare method as the implementation in Islamic-based social development.

Challenges of Social Development

Development is a process of improvement from one state to a better state encompassing all aspects, be it humanity, materialism, knowledge and technology. In other words, development contains the idea to increase capability and potential in forward movement begin from a lower position to a greater position in terms of achievement, opportunity and benefit. Other than that, definition is also a process of structuring a proactive society or nation towards a better quality of life.

Social development is one of the most important aspects to develop a nation. It is a method to improve the status of a society. According to previous research, the purpose of social development is to build the strength of the society from every aspect. In other study claimed that social development is a development process that focus on human and their social system. It involves various strategies, programs and activities that emphasize on values to increase life quality and wellbeing. Social development is defined from the perspective of Islam as a focal value in Islam that urges man to act in politics, religion, social and economy.

In other words, social development in Islam can be defined as a balanced development between religious, social, political and economic aspects. Unfortunately, current situation does not illustrate this definition as the moral values of culture and religion in the society are eroded by the global culture. Efforts to achieve Islamic-based social development have become tougher as the understanding towards cultural and religious values has weakened. Furthermore, various negative elements now become the sources of social problems that lead to mental disease.

Mental Health

Mental health is a state in which an individual reacts positively or negatively to his or her surroundings. WHO defines mental health as psychological wellbeing. For this international organisation, a healthy mental means healthy mental state and capability to function at a satisfactory level of emotional and behavioural adaptation. WHO stated that mental health encompasses an individual’s capability to enjoy life and create a balance between life activities and the efforts to achieve psychological resistance. Based on this definition, mental health involves mental and emotional health that serve to be as important aspects in human psychology.

Other than the aspect of psychology, mental health according to Islam is also a state of health that influences human behaviour. However, discourse about mental health in Islam tends to be focused more on spiritual aspect. Mental health in Islam is associated with having
a healthy heart. It means believing in God, friendship, and cooperation with other people. In previous study points out that mental health in Islam is a reaction of human psychology, emotions and physicality with their life experiences. In other study adds that one’s mental state and condition can react to the social obstacles and values that might oppose the mainstream society, values, culture and Islam.

In previous research states that mental health for Muslims depends on one’s characteristics comprising of two mutually-connected components namely physical and soul. The latter will react to control every action done physically. Thus, he stated that if one’s soul is good, then the physical conduct will be good too. Meanwhile, if the soul is not good, one might break the Islamic rules and limits. It is belief that the ease of mind able to encourage human towards life wellbeing, depends on how one’s understanding and committing to soul-cleansing process or better known as tazkiyah al-nafs. Tazkiyah al-nafs is a process of soul enlighten in the form of inner cleansing and outer formation so that any ill intention or poor characteristics that can lead to mental and behavioural disorders can be controlled.

There are four stages of tazkiyah al-nafs. The first stage is the anatomical control of human physical state with the control of seven part of human’s body parts as the first element that should be taken care of. They are the eyes, ears, tongue, stomach, the genitals, a pair of feet and hands. This stage stressed on the enjoyment of the body by preserving body parts from the bad deeds and channel them towards good deeds. The second stage is elimination of negative elements. At this second stage, one must diagnose himself or herself by evaluating any negative elements that they have. In previous study outlined ten negative elements which are the most detrimental such as, greed towards food, talking about pointless things, anger, jealousy, stingy and materialistic, love towards worldly assets, proud, arrogance, vanity and ostentation.

The third stage is the stage of inculcation and strengthening of positive attributes. It requires the efforts to empower, reinforce and systemise good noble behaviours following Islamic law so that human’s life can be more directed and stay in a religious scope. The final stage encompasses the stability and surrendering of a person to Allah SWT. The final process is the peak of tazkiyah al-nafs which is perfected through four attributes of praised characteristics namely love for Allah SWT, accepting the fate of Allah SWT, remembering the death and thankful for every blessing.

THE RELATIONSHIP BETWEEN MENTAL HEALTH AND ISLAMIC SOCIAL DEVELOPMENT

Progress, urbanisation and globalisation have given a striking implication to the society and nation which are striving to balance between social development and economic growth. Behind an exponential development, there are emergence of trend related to mental health issues. This might be an indication for desperate needs of safety and protection, serenity and in result of mental and physical wellbeing.

Religion has a significant influence in mental health. According to previous study, religion can increase the level of mental health in a positive way. However, it is also capable to ruin mental health. Both condition depends on the interpretation towards religious values, spiritual aspiration, communication ability and belief. When all these aspects have been carried out positively, religion benefits mental health by giving a sense of wellbeing, better life quality and contributing to low rates of depression, anxiety and suicide. However, if religion is implemented negatively, individuals will be exposed to spiritual struggle when coping with mental issues which is called as religious coping. Based on previous study opinion, religious influence towards mental health relates with the acceptance and the process of individual evaluation on the religious values.

According to previous research, humans are always searching for divinity power that can ensure their wellbeing before or after death. This humanistic nature leads humans to live a religious life that involves rituals of soul cleansing and worshipping aiming to attain the state of wellbeing. This is consistent with the decree of Allah in Al-Quran:

“Thus, do remember Me, so I could reward you with goodness; and be grateful to me and do not be deviant. To most pious men, ask for help with patience and perform your prayer because Allah will be with those who are patient.”

(al-Baqarah, 2:152)

Based on this decree, the soul-cleansing process through tazkiyah al-nafs that opens the room for one to
remember The Almighty Allah and to improve oneself hence become the opportunity for them to become closer to Him. Due to this, tazkiyah al-nafs of humans is expected to ensure individuals’ mental health and wellbeing to be in line with Islamic demands thus realising the aims of the Islamic-based social development. The mental wellbeing obtained by humans must always be in pursuit of Allah’s pleasure, regulation of physical behaviour, rectification of negative traits and implementation of good and noble practices and characteristics.

**Conclusion**

Mental disease is a disturbance that involves the change in thinking, emotion and behaviour that can cause difficulties in undergoing daily life. Diseases related to the soul is a worrying issue and can give a negative implication to the Islamic social development. Mental health has even become the government’s cause for concern as its impact towards the national development is more extensive. Humans are the most important element in Islam. Thus, a holistic mental health is very important to the life of individuals and the society especially for the purpose of the Islamic social development. Thus, various strategies have to be carried out to eradicate mental diseases and next, to render success to the process of Islamic social development to achieve the blessings of Allah

**Ethical Clearance:** Nil

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**

17. Mohamad AD, Hamjah SH, Mokhtar AI. The concept of Tazkiyah al-Nafs according to al-Harith Bin Asad al-Muhasibi. Sultan Alauddin Sulaiman


An Analysis of Mercury (Hg) Content in Drinking Water with Renal Dysfunction in the Traditional Gold Miners in TahiIte village, District of Rarowatu, Bombana Regency

Lucia Yogyana Suramas¹, Anwar Daud¹, Agus Bintara Birawida¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study to analyze mercury (Hg) content in the water toward renal dysfunction among gold miners in TahiIte village, Rarowatu district, Bombana regency, Southeast Sulawesi Province. This study was conducted in TahiIte village, Rarowatu district, Bombana regency. This study was used a quantitative observational research with cross sectional approach. The samples were taken from well water samples and respondent’s urine and conducted with purposive sampling. There were 32 respondents in this study. The data were analyzed used correlation test. The mercury content (Hg) in the drinking water source among gold miners in TahiIte village was below than limitation by Regulation of Health Minister (Permenkes) 492/2010 (<0.001 mg/L). The mercury content in gold miner’s urine was ranged from 3.8788 µg/L to 155.4950 µg/L. There were 31 respondents (96.7%) had mercury content in urine that higher than 4 µg/L. There were 4 respondents had experienced albuminuria as early symptom on kidney disease in traditional gold miners. There was no significant relationship between working period and water consumption duration had increased albumin content in urine. Besides, there was no significant relationship between ages with mercury content in the urine. The higher in working period, water consumption duration and nutritional status had increased mercury content in urine. There also no significant relationship between mercury content on urine and drinking water with kidney failure.

Keywords: Mercury; Renal dysfunction; Traditional gold miners; Urine

Introduction

The purpose of mercury in the gold mining was separated gold from sand through amalgamation process. The mercury in the water disposed into soil and groundwater and potentially made water became acidic and contained heavy metals. The waste with no treatment had higher chemical concentration entered the groundwater aquifer. There were factors that related to metal exposure such as mercury in the mine area. The risk factors related to mercury exposure such as resident period, gender, occupation, health status and distance from pollutant source.

The mercury poisoning had commonly found in the gold miners through skin contact, inhalation and food contaminated consumption. The mercury contamination caused some health problems in brain, lungs, nervous system and kidney. The mercury (Hg) content in urine was indicator that used to examine the mercury (Hg) contamination in gold miners since the urine accumulated mercury for long period. There were 40 people had mercury contamination in the urine among gold miners in Jenda village, Selogiri sub-district, Wonogiri regency.

The mercury contamination had increased in environment and food chain. In Indonesia, mercury was used in various industries especially small scaled gold mining in gold amalgamation process. The initial symptom of mercury exposure was examined by urine testing. There were increased protein molecules in the urine among gold miners for 5-10 mg/g of creatinine.

TahiIte village was gold mining location in Rarowatu Bombana district. The villagers had worked in gold mining near hill area and lump was separated in amalgamation process which is using mercury. The
tailing waste was released to the environment which contaminated soils and groundwater in TahiIte village. Most of villagers used the water from well for their drinking water source. The mercury usage in the gold mining was predicted contaminate in water and caused renal dysfunction in gold miners that consumed the water. Based on these background, a study was conducted to analyze mercury (Hg) content in the water toward renal dysfunction in gold miners in TahiIte village, Rarowatu district, Bombana regency, Southeast Sulawesi Province.

**Methodology**

**Study Type**

This study was quantitative observational research with cross sectional approach.

**Location and Time**

This study was conducted in TahiIte village, Rarowatu district, Bombana regency, Southeast Sulawesi province. The study was conducted from April to May 2016. In this study, the variables were included working period, working hours per day, water consumption period and nutritional status in traditional gold miners in TahiIte village.

**Population and Sample**

The gold miner group that have risk in mercury poisoning in the gold mining area in TahiIte village. The population for drinking water was from water resources. The samples for this study were gold miners that still active working in gold mining with purposive sampling based on the criteria as follows:

i) The gold miners willing to be respondents and give urine samples

ii) Still working as an active miner

iii) The gold miners that have working period more than 1 year

iv) The gold miner aged between 15 years and 64 years

The gold miners urine was taken in morning and stored in the container and check the albuminuria content by dipstick method. The mercury level analysis was used atomic absorption spectroscopy (AAS) at Central Health Laboratory of South Sulawesi province. The drinking water samples were taken from water resource that daily consumption by gold miners in TahiIte village.

**Data Collection**

The primary data was obtained included mercury level in water and urine, working hours per day, working period, water consumption period and nutritional status through questionnaire. Meanwhile, secondary data was collected from relevant government or private agencies. This study was conducted in TahiIte village, Rarowatu district, Bombana regency. This study was used a quantitative observational research with cross sectional approach. The samples were taken from well water samples and respondent’s urine and conducted with purposive sampling. There were 32 respondents in this study. The data were analyzed used correlation test.

**Data Analysis**

The data was analyzed used SPSS program version 21. The univariate analysis was described in frequency distribution table. The bivariate analysis was conducted to determine relationship between independent variable (mercury) on water, nutritional status, water consumption, working period and working hours per day with dependent variable such as mercury content in urine and renal dysfunction.

**Result and Discussion**

**Univariate Analysis**

Based on Table 1, the higher mercury content was observed at point 8 which was 0.4730 µg/L and was drank by 13 respondents (40.6%). The lowest mercury content was at point 3 (0.2524µg/L) and only 2 respondents (6.3%) used point 3 as their drinking water source. Next, Table 2 showed albuminuria content in 32 respondents. There were 28 respondents (87.5%) that had negative proteinuria and only 1 respondent (3.1%) had ++ (75 mg/dl) proteinuria. Based on Table 2, there were 31 respondents (96.9%) had mercury content in their urine more than 4µg/L. Meanwhile, only 1 respondent (3.1%) had mercury content less than 4µg/L.

From Table 3, there were 10 respondents (31.3%) had worked for 10 years in the mine. Meanwhile, there was 1 respondent (3.1%) worker for 2 years and 3 years. A shown in Table 3, there were 8 respondents (25%) that had water consumption period for 5 years.
Besides, there was only 1 respondent (3.1%) that had consumed contaminated water for 1 year.

Based on Table 4, there were 26 respondents who worked 8 hours per day and only 2 respondents that worked for 14 hours per day. In Table 5, there were 21 respondents that had normal body mass index (BMI) compared to 3 respondents that were obesity (BMI > 27.0).

Table 1. Distribution of mercury content on drinking water in TahiIte village

<table>
<thead>
<tr>
<th>Point</th>
<th>Mercury content (Hg) (µg/L)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.3433</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>2</td>
<td>0.3368</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>3</td>
<td>0.2524</td>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>4</td>
<td>0.3822</td>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>5</td>
<td>0.3238</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>6</td>
<td>0.3043</td>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>7</td>
<td>0.2719</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>8</td>
<td>0.4730</td>
<td>13</td>
<td>40.6</td>
</tr>
<tr>
<td>9</td>
<td>0.2654</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2. Distribution of albuminuria on traditional gold miners and mercury (Hg) content in traditional gold miner’s urine in TahiIte village

<table>
<thead>
<tr>
<th>Albuminuria</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>28</td>
<td>87.5</td>
</tr>
<tr>
<td>+ (24 mg/dl)</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>++ (75 mg/dl)</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mercury (Hg) content in urine</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 4 µg/L</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>&gt; 4 µg/L</td>
<td>31</td>
<td>96.9%</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3. Distribution of working period of traditional gold miners in TahiIte village

<table>
<thead>
<tr>
<th>period (years)</th>
<th>Working</th>
<th>Water consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>18.8</td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>21.9</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>21.9</td>
</tr>
<tr>
<td>8</td>
<td>10</td>
<td>31.3</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4. Distribution of working hours per day of traditional gold miners in TahiIte village

<table>
<thead>
<tr>
<th>Working (hours/day)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>26</td>
<td>81.3</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5. The distribution of traditional gold miners in TahiIte village

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>BMI level</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>17.0-18.5</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>Normal</td>
<td>18.5-25.0</td>
<td>21</td>
<td>65.6</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0-27.0</td>
<td>5</td>
<td>15.6</td>
</tr>
<tr>
<td>Obesity</td>
<td>&gt;27.0</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Bivariate Analysis
Based on Table 6, there was a significant relationship between working period and water consumption duration with renal dysfunction in traditional gold miners in Tahilte village. The longer the working period and water consumption period, the higher the albumin contents in the urine \((p<0.05)\). Besides, no significant relationship between working hours per day, nutritional status, age, mercury \((Hg)\) content on water and urine with renal dysfunction in traditional gold miners in Tahilte village.

In Table 6, there was no significant relationship between age with mercury \((Hg)\) content in urine \((p=0.908>0.05)\). In addition, the working period, working hours per day, water consumption period, nutritional status and mercury \((Hg)\) content on water had significant relationship with the mercury \((Hg)\) content in the urine.

### Overall Discussion

In this study, working period among traditional gold miners was 2-8 years. There was a significant relationship between working period and renal dysfunction \((p=0.048<0.05\) and \(r=0.353\)). The result shows no significant relationship between the working hours per day and renal dysfunction with \(p=0.245>0.05\) and \(r=0.212\). The positive \(r\) value indicated longer working period caused higher potential in renal dysfunction. The mercury continuously entered in human body in term of methyl or alkyl form caused permanent damaged to the brain, liver and kidney\(^6\). The inorganic mercury compound had absorbed by lung and transferred through blood to the kidneys\(^7\). The inorganic mercury compound had accumulated in the kidney and removed with urine. In a study found long term work exposure caused renal dysfunction among miners in Slovenia\(^8\). The mercury poisoning symptom included anemia, albuminuria, renal dysfunction and affected gastrointestinal system\(^9\).

The statistical test result showed \(p=0.019<0.05\) with \(r=0.412\) which meant there was relationship between water consumption period and renal dysfunction. The statistical test result showed no significant relationship between nutritional status with renal dysfunction \((p=0.416>0.05\) and \(r=-0.149\)). Even though, 3 respondents had exposed to albuminuria 25
mg/dL, which respondents were in normal, overweight and obesity. The respondents with renal dysfunction with albuminuria of 75 mg/dL had body mass index (BMI) of 17.58 (underweight). This study showed renal dysfunction happened on anyone within any BMI category. In contrasts, theory had showed nutritional status had influenced the disease.  

The albumin in urine is indicated renal dysfunction. The result showed no significant relationship between age and renal dysfunction (p=0.421>0.05 and r=−0.147). The age did not related on renal dysfunction since respondent aged 17 years old had positive albumin in the urine.

This study indicated a significant relationship between working period and mercury (Hg) content in the urine (p=0.005<0.05 and r=0.481). There was a significant relationship between working hours per day and mercury (Hg) content in the urine (p=0.007<0.05 with r=0.470). There was a significant relationship between water consumption period with mercury (Hg) content in the urine (p=0.033<0.05 and r=0.378). The positive r value showed longer working period in the mine had increased mercury (Hg) content in the urine. In RengasTujuh village, a study showed working duration, working period and personal protective equipment implementation had influenced urine mercury level among gold miners. In additions, there was a significant relationship between nutritional status and mercury (Hg) content in the urine (p=0.011<0.05 and r=0.444). There was no relationship between age with mercury (Hg) content in the urine (p=0.908>0.05 and r= 0.021).

The water samples were contained mercury (Hg) between 0.2524 to 0.4730 μg/L. However, mercury (Hg) content in drinking water was still below the Permenkes standard 492/2010 (<0.001 mg/L). Even though, the mercury had contaminated on the water source in the mine, but it did not polluted water source in the community. The factors that influenced concentration of mercury in the human body were exposure duration, mercury compound type, mercury dose entered in body, body metabolism and age. The maximum level was allowed only 0.001 ppm. There was significant relationship between mercury (Hg) content in drinking water with mercury (Hg) in the urine (p=0.048>0.05). Based on this study, 31 respondents (96.7%) had exceeded mercury content in urine accorded to World Health Organization, WHO (<4μg/L). The mercury (Hg) content had influenced by exposure through inhalation and skin contact that resulted high mercury (Hg) content in the gold miners in Tahilte village.

The statistical result showed a significant relationship between mercury (Hg) content in the urine with renal dysfunction in traditional gold miner (p=0.814>0.05 and r=0.043). The albumin level more than 500μg/L was considered as dangerous lead to mercury intoxication. Furthermore, no significant relationship on mercury (Hg) content with renal dysfunction because mercury (Hg) content in urine was still below than 500 μg/L so some respondents still not showed the disease symptom.

There was no significant relationship between mercury (Hg) content in the drinking water with renal dysfunction (p=0.073>0.05). The mercury reached in the digestive system through food and contaminated water. The mercury entered the bloodstream and absorbed by the organ and accumulated in the kidney. Besides that, the mercury exposure through respiratory system also resulted in renal dysfunction due to proteinuria or nephrotic syndrome and acute tubular necrosis.

**Conclusion**

In conclusions, mercury content (Hg) in the drinking water source among gold miners in Tahilte village was below than limitation by Permenkes village was below than limitation by Permenkes 492/2010 (<0.001 mg/L). The mercury content in gold miner’s urine is ranged from 3.8788 μg/Lto 155.4950 μg/L. There were 31 respondents (96.7%) had mercury content in urine that higher than 4 μg/L. There were 4 respondents were experienced albuminuria as early symptom on kidney disease in traditional gold miners. There was no significant relationship between working period and water consumption duration had increased albumin content in urine. Besides, there was no significant relationship between age with mercury content in the urine. The higher in working period, water consumption duration and nutritional status had increased mercury content in urine. Besides, no significant relationship between mercury content on urine and drinking water with kidney failure. The environment friendly program and counseling for traditional gold miners about dangerous of direct contact with mercury. The routine mining area and medical checkup has suggested on gold miners in Tahilte village so that precautionary measurement taken as early as possible.
Acknowledgment: The author would like to acknowledge the participants of TahiIta village and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: NIL

Conflict of Interest: NIL

References


4. Trilianty L. Factors associated with Poisoning (Hg) In MiningEntertainment (Box) In SubdistrictKurun, Regency of Gunung Mas, Central Kalimantan. [Internet]. 2010 [cited 2018 Nov 5]. Available from: http://eprints.undip.ac.id/23859/1/TRILIANTY_LESTARISA.pdf


The Determinant Quality of Antenatal Care in the Rural Area of Jeneponto Regency

M. Wahidin¹, Ansariadi¹, Nurhaedar¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study to determine the factors related to the quality of antenatal care in the rural area of Jeneponto Regency. The study was an observational analytic study with cross sectional study. The populations were all women who giving birth from January to May 2016 in rural area of Jeneponto Regency in 2016. The samples were mothers lived in the villages in working areas of Bontomate’s Health Centre which consisted of 277 respondents. They were selected by cluster technique taken from each of four villages. The data were analyzed by computerization with SPSS application with chi square test and logistic regression test and multivariate test. The maternal reproductive status had no significant relationship with quality of antenatal care with p value =0.373> 0.05. The higher family welfare level had increased opportunity to obtain in the quality of antenatal care. The family support was related in maternal efforts on quality of antenatal care (p=0.009<0.05). Besides, the health center distance also affected in the quality of antenatal care with p=0.001<0.05. The closer health center with respondent house had increased the quality antenatal care. The mother’s decision making was not affected efforts to meet quality of antenatal care. Most influential factor on the quality antenatal care was family welfare level.

Keywords: Antenatal care; Determinant; Quality

Introduction

There were 535 900 maternal mortality worldwide between 1990 and 2005 with sub-Saharan Africa and Asia are recorded highest maternal mortality rate for 50% and 45% respectively¹. In global, maternal mortality rate had decreased by 45% in between 1990 to 2013. An estimated 15% to 20% of pregnant women in both developed and developing countries had experienced high risk complications due to lack of maternal health care quality², ³. The main cause of maternal mortality included hypertension in the pregnancy and postpartum hemorrhage had minimized if the quality of antenatal care was well implemented⁴. The pregnant women regularly had their antenatal care visit more alert on preparation for emergency time⁵. There were 20% of pregnant women had experienced pregnancy complication⁶. The high quality of antenatal care had reduced maternal mortality⁷. In India, many factors affected quality of antenatal care such as maternal education, lack of knowledge in pregnancy diet and pregnancy complications⁸. The quality of antenatal care also affected by the access to health facilities, number of health worker, attitudes, awareness on antenatal care and decision making for seek health care⁹. In Indonesia, no research on quality of antenatal care based on service components but only depend on labor data and health care visit⁹. There was many antenatal care services had implemented in public health center (Puskesmas), auxiliary public health centre(Pustu), village health post (Poskesdes), integrated service posts (Posyandu) even home visit from health worker. However, there was no antenatal care component coverage report based on facility type. Based on this observation, this study had been on determine quality of antenatal care in the rural area of Jeneponto regency.

Methodology

Study Type

The type of study was an observational based analytic population with cross sectional research design. This study was analyzed quality of antenatal care service in Jeneponto district rural area based on antenatal care
component and antenatal care service location.

Location and Time

This study was conducted in rural area of Jeneponto regency. The selected area for this study was Bontomate’nePuskesmas and BontorambaPuskesmas. Bontomate’nePuskesmas clustering area included Bululoe village, Bungungloe village, Parasangangberu village. Meanwhile, BontorambaPuskesmas included Kareloe village, Tanammawang village, Lenu village and Maero village. The study was began with data collection and study population in first week of June, clustering of study area and primary data collection in study area between third week of June until first week of July 2016. The data processing was done in the second and thirds week of July.

Population and Sample

The sample in this study was pregnant women that delivered infants in January to June 2016 in rural area of Jeneponto regency 2016 with 8 cluster of village in BontorambaPuskesmas and Bontomate’nePuskesmas. This study is consisted of 277 respondents that met criteria as follow:

i) Domicile started since last pregnancy.
ii) Willing to be respondents.
iii) Being in place during the study.

Data Analysis

The data had been collected and analyzed by computerized using SPSS program. The bivariate analysis was conducted to determine relationship between independent and dependent variables by used logistic regression test. Meanwhile, multivariate analysis was done to determine relationship between welfare level and dependent variable that controlled with other factors.

Result and Discussion

Bivariate Analysis

Based on Table 1, 78 respondents (52.7%) had received more in antenatal care quality in reproductive status parity 2-3. Meanwhile, 13 respondents from parity >3 had received more quality in antenatal care. There was no significant relationship between maternal reproductive statuses with antenatal care quality in rural area of Jeneponto regency. The respondents with poor of family welfare likely received unqualified antenatal care of 105 respondents. There was a significant relationship between family welfare levels with quality of antenatal care in rural areas of Jeneponto regency. In additions, 133 respondents (48.0%) had obtained higher quality of antenatal care with their family supports. Besides, there was a significant relationship between family welfare levels with quality of antenatal care in rural areas of Jeneponto regency. In additions, 133 respondents (48.0%) had obtained higher quality of antenatal care with their family supports. Besides, there was a significant relationship between family welfare levels with quality of antenatal care in rural areas of Jeneponto regency. In additions, 133 respondents (48.0%) had obtained higher quality of antenatal care with their family supports. Besides, there was a significant relationship between family welfare levels with quality of antenatal care in rural areas of Jeneponto regency. In additions, 133 respondents (48.0%) had obtained higher quality of antenatal care with their family supports. Besides, there was a significant relationship between family welfare levels with quality of antenatal care in rural areas of Jeneponto regency. In additions, 133 respondents (48.0%) had obtained higher quality of antenatal care with their family supports.

Table 1. Relationship between independent variables and antenatal care status

<table>
<thead>
<tr>
<th>Antenatal Care quality</th>
<th>Unqualified</th>
<th>Qualified</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Reproductive status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity 1</td>
<td>52</td>
<td>53.6</td>
<td>45</td>
<td>46.4</td>
</tr>
<tr>
<td>Parity 2-3</td>
<td>70</td>
<td>47.3</td>
<td>78</td>
<td>52.7</td>
</tr>
<tr>
<td>Parity &gt;3</td>
<td>19</td>
<td>59.4</td>
<td>13</td>
<td>40.6</td>
</tr>
</tbody>
</table>
Cont... Table 1. Relationship between independent variables and antenatal care status

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of Poor</th>
<th>% Poor</th>
<th>No. of Rich</th>
<th>% Rich</th>
<th>p value</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family welfare</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>105</td>
<td>61.0</td>
<td>39.0</td>
<td>172</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Rich</td>
<td>36</td>
<td>34.3</td>
<td>65.7</td>
<td>105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>83.3</td>
<td>16.7</td>
<td>18</td>
<td>0.009</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>126</td>
<td>48.6</td>
<td>51.4</td>
<td>259</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accessibility to health facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far</td>
<td>32</td>
<td>74.4</td>
<td>25.6</td>
<td>43</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Near</td>
<td>109</td>
<td>46.6</td>
<td>53.4</td>
<td>234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal involvement in decision making</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not involved</td>
<td>29</td>
<td>60.4</td>
<td>39.6</td>
<td>48</td>
<td>0.197</td>
<td></td>
</tr>
<tr>
<td>Involved</td>
<td>112</td>
<td>48.9</td>
<td>51.1</td>
<td>229</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data

Table 2. Selection result of candidate model

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>p value</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Reproductive status</td>
<td>0.373</td>
<td>(-)</td>
</tr>
<tr>
<td>2.</td>
<td>Family welfare</td>
<td>0.000</td>
<td>(+)</td>
</tr>
<tr>
<td>3.</td>
<td>Family Support</td>
<td>0.009</td>
<td>(+)</td>
</tr>
<tr>
<td>4.</td>
<td>Accessibility to health facilities</td>
<td>0.001</td>
<td>(+)</td>
</tr>
<tr>
<td>5.</td>
<td>Maternal involvement in decision making</td>
<td>0.197</td>
<td>(-)</td>
</tr>
</tbody>
</table>

Information: (+) enter the model, (-) not enter the model

**Multivariate Analysis**

Based on bivariate analysis result, reproductive status was not correlated with antenatal care status with p=0.373 and maternal involvement in decision making with p value=0.197. The respondent characteristic on age, education level, health facilities visit frequency and delivery sites, which are assumed to be related to antenatal care quality was included into multivariate analysis.

Based on result of multivariate analysis in Table 3, family welfare showed highest value was 15.187 so statistically is dominant factor or variable that most influenced to antenatal care status. Based on OR value=0.347 (95% CI 0.204-0.591) meant respondents with poor welfare 0.347 times had chance to get poor antenatal care quality compared to respondent that with rich status in rural area of Jeneponto regency 2016.

Table 3. Multivariate Analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Variables</th>
<th>B</th>
<th>p value</th>
<th>Wald</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>0.103</td>
<td>0.732</td>
<td>0.117</td>
<td>0.902</td>
<td>0.500-1.628</td>
</tr>
<tr>
<td>2.</td>
<td>Education level</td>
<td>0.290</td>
<td>0.365</td>
<td>0.822</td>
<td>0.748</td>
<td>0.400-1.401</td>
</tr>
<tr>
<td>3.</td>
<td>Health facilities visiting</td>
<td>0.396</td>
<td>0.341</td>
<td>0.908</td>
<td>0.673</td>
<td>0.298-1.519</td>
</tr>
<tr>
<td>4.</td>
<td>Delivery sites</td>
<td>0.499</td>
<td>0.534</td>
<td>0.386</td>
<td>0.607</td>
<td>0.126-2.927</td>
</tr>
<tr>
<td>5.</td>
<td>Family welfare</td>
<td>1.057</td>
<td>0.000</td>
<td>15.187</td>
<td>0.347</td>
<td>0.204-0.591</td>
</tr>
<tr>
<td>6.</td>
<td>Accessibility to health facilities</td>
<td>1.120</td>
<td>0.005</td>
<td>8.013</td>
<td>0.326</td>
<td>0.150-0.709</td>
</tr>
<tr>
<td>7.</td>
<td>Family support</td>
<td>1.372</td>
<td>0.043</td>
<td>4.112</td>
<td>0.254</td>
<td>0.067-0.955</td>
</tr>
</tbody>
</table>

Source: Primary data
Overall Discussion

There was no significant relationship between parity with quality of antenatal care. The mother in parity 1 tended to visit health care because mother had some concern during their first trimester. However, there is no significant disparity to show difference in the proportion to the parity between quality and non-quality. In additions, parity was related to pregnancy complications especially in high parity (>5) and lower parity (≤1) were more dominant in pregnancy complications10. The potential pregnancy complications in women had increased maternal mortality rate in rural area of Jeneponto regency.

The family welfare level had related with quality of antenatal care. The women came from rich background were three times likely to receive quality of antenatal care than women from poor background11, 12. In this study, most of respondent’s husband worker as farmer or fisherman with uncertain family income level. The family welfare in the rural area was very small, but rich families had more access to the health center13. The government had provided free access on health center for poor families and home visit program for pregnant women who did not completed their antenatal care check. Unfulfilled quality of antenatal care among poor families in Jeneponto regency also influence by low education among women. Women had obtained completed education more likely had antenatal care than uneducated women12. Health problem on poor families was due to their reluctant to seek health service since there were a gap among health worker with patient, limited in health facilities and low knowledge in deal with the health problem14. The women from poor background had non quality health service included antenatal care15.

The respondents had family support were more likely had quality of antenatal care than respondents with no family support. There was important women had their family support to meet their quality of antenatal care16. The family support had occupied important position for positive, emotional, information and appreciation17. In this study, family support was related to antenatal care coverage and affected antenatal care utilization quality. The lack of awareness in antenatal care quality that resulted in less family support on utilizes the antenatal care service which increased the risk in maternal mortality. There was a significant relationship between health facilities access with quality of antenatal care. The lack of antenatal care quality was due to the health facilities distance from house8. The pregnant women more likely meet quality of antenatal care if the health facilities were closer with their house17. The health facilities had related with quality of antenatal care in rural area of Jeneponto district in this study. The government had implemented to build more health center in most of villages for provided health service.

Besides that, there is no significant relationship in maternal involvement for decision making with the quality of antenatal care. In contrast, the decision making among women was important to obtain quality of antenatal care8. The women involved in decision making had higher chance to receive completed antenatal care than women that never involved in any decision-making11. The women needed to have their own decision on her antenatal care visit and not relied on her family for the decision.

Conclusion

In conclusion, maternal reproductive status had no significant relationship with quality of antenatal care. Higher family welfare level had increased opportunity to obtain in the quality of antenatal care. The family support was related in maternal efforts on quality of antenatal care. Besides, health center distance also affected in the quality of antenatal care. The closer health center with respondent’s house had increased quality antenatal care. The mother’s decision making was not affected efforts to meet quality of antenatal care. Most influential factor on the quality antenatal care was family welfare level.

Acknowledgment: The author would like to acknowledge the participants of BontorambaPuskesmas and Bontomate’nePuskesmas as well asFaculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

REFERENCES


Relationship of Management Functions Implementation with Health Workers’ Performance in Batua Public Health Centre at Makassar City

Machsur Tunggal¹, Yusri Abadi¹, Darmawansyah¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The productivity of an organization strongly depends on the management itself. A good management will create a productive and efficient work atmosphere. This is crucial especially at hospitals and health care centre since it deals with lives. Therefore, the management is responsible in ensuring the staffs are at their highest performance level. With that in mind, the aim of this study is to determine the relationship between management function implementation and health workers performance in public health centre (Puskesmas) Batua at Makassar city. The study type was quantitative research with cross sectional approach. 43 respondents have participated in this study. The primary data was obtained by questionnaire and secondary data had been obtained from Puskesmas administration section such as Puskesmas profile and number of staffs. The results found there was a correlation between planning function (p= 0.008), organizing function (p=0.011), actuating function (p =0.014) and controlling function (p= 0.0.011) with health workers’ performance.

Keywords: correlation study; health worker performance; management functions; public health centre

Introduction

The management is described as process involved in technical and social functions and activities which happens within an organizations in achieving the goal through humans and other resources¹. The health care and patient safety are common principle in all primary and secondary health care providers². There are six management functions implementation which included planning, organizing, staffing, controlling, directing and decision making³. Besides, the competencies also influenced management effectiveness such as technical, conceptual and interpersonal skills.

Indonesia have public health centre (Puskesmas) which consisted of 9759 units 3401 inpatient units and 6358 outpatient units. In South Sulawesi, there were 227 inpatient units and 221 outpatient units⁴. Puskesmas Batua has 43 health workers consisting of 3 general doctors, 1 administrative worker, 2 dentists, 2 specialist doctors, 2 pharmacists, 16 general nurses, 1 pharmacist assistant, 2 sanitarians, 3 nutritionists, 1 dental nurse, 2 laboratory workers, 7 midwives and 1 health promotion worker⁵. Puskesmas performance assessment had been done by internal organization including resource management such as medical tools, medicine, financial and workers and supported by Puskesmas Management Information System (SIMPUS). The performance is influenced by individual characteristics (abilities and skills, personality, perception, attitude, experience, gender, age, race, personal characters and learning capacity) and working environment (organization structure, job design, policy, rules, rewards, sanctions and resources). The performance assessment through self-assessment is among common approach in individual measurement and understanding⁶.

Puskesmas Batua is a health centre that had health quality standard using ISO 9001-2000, application of international health service⁷. The aim of this study is to determine relationship between management function implementation and health workers’ performance in

Corresponding author:
Machsur Tunggal
E-mail: machsurtunggal01@gmail.com
public health centre (Puskesmas) Batua at Makassar city.

Methodology

Study Type

This study used quantitative research with cross sectional approach.

Location and Time

This study was conducted from February 2017 to March 2017 in Puskesmas Batua at Makassar city.

Population and sample

The population in this study were all health workers in Puskesmas Batua. The sample sizes were 43 respondents who are working in Puskesmas Batua.

Data Collection

The primary data was obtained by questionnaire and secondary data had been obtained from Puskesmas administration section such as Puskesmas profile and number of staffs.

Data Analysis

The data was analysed using SPSS program. The bivariate analysis was obtained to determine relationship between dependent and independent variables in the form of cross tabulation with Chi-square test.

Result and Discussion

Bivariate Analysis

Based on Table 1, 36 respondents (94.7%) had good planning with good performance and only 2 respondents (5.3%) had good planning but poor performance. Meanwhile, 2 respondents (40.0%) had good performance but poor in planning, while 3 respondents (60%) had poor performance with poor planning. Based on Fisher’s Exact test, there was a significant relationship (p = 0.008) between planning functions and health workers’ performance in Puskesmas Batua.

Table 1. Relationship between planning function and health worker performance in Puskesmas Batua

<table>
<thead>
<tr>
<th>Planning</th>
<th>Performance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Good</td>
<td>36</td>
<td>94.7</td>
<td>2</td>
</tr>
<tr>
<td>Poor</td>
<td>2</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>88.4</td>
<td>5</td>
</tr>
</tbody>
</table>

* Fisher’s Exact test

As shown in Table 2, there were 36 respondents (97.3%) who had good organizing and performance and only 1 respondent (2.7%) had poor performance with good organizing. In additions, 2 respondents (33.3%) had poor organizing with good performance and 4 respondents (66.7%) had poor performance with poor organizing. There was significant relationship (p = 0.001) between organizing function and health workers’ performance.

Table 2. Relationship between organizing function and health worker performance in Puskesmas Batua

<table>
<thead>
<tr>
<th>Organizing</th>
<th>Performance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Good</td>
<td>36</td>
<td>97.3</td>
<td>1</td>
</tr>
<tr>
<td>Poor</td>
<td>2</td>
<td>33.3</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>88.4</td>
<td>5</td>
</tr>
</tbody>
</table>

* Fisher’s Exact test
Based on Table 3, 35 respondents (94.6%) had good actuating with good performance and 2 respondents (5.4%) had poor performance and good actuating. Besides, 3 respondents (50%) had poor actuating and good performance, while 3 respondents (50%) had poor performance with poor actuating functions. There was significant relationship between actuating functions and health workers’ performance since p value equals to 0.014.

Table 3. Relationship between actuating function and health worker performance in Puskesmas Batua

<table>
<thead>
<tr>
<th>Actuating</th>
<th>Performance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>p-value</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>Good</td>
<td>35</td>
<td>94.6</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Poor</td>
<td>Good</td>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>3</td>
<td>50</td>
</tr>
</tbody>
</table>

* Fisher’s Exact test

Based on Table 4, 38 respondents (92.7%) had good performance and good controlling and 3 respondents (7.3%) had poor performance with good controlling. Meanwhile, 2 respondents (100%) had poor performance and poor controlling. Based on Fisher’s Exact test, p-value of 0.011 indicated there was a significant relationship between health workers’ performance.

Table 4. Relationship between controlling function and health worker performance in Puskesmas Batua

<table>
<thead>
<tr>
<th>Controlling</th>
<th>Performance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>p-value</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>Good</td>
<td>38</td>
<td>92.7</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td>Poor</td>
<td>Good</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>Good</td>
<td>38</td>
<td>88.4</td>
</tr>
</tbody>
</table>

* Fisher’s Exact test

Overall Discussion

The result found that 38 respondents had good planning functions. These results had pointed out that planning functions had influenced on health workers’ performance in Puskesmas Batua. The first step in planning is grouping the work before task division\(^9\). A study found relationship between planning with nurse’s performances in the inpatient ward of Fatmawati Hospital\(^9\). Good planning contributed to several benefits such as the organization know objectives to be achieved and how to achieve them\(^10\). Nonetheless, nurses’ work quality is not influenced by the planning functions at Puskesmas\(^11\).

In this study, organizing functions was health workers’ main duty to be carried out and this function is based on skills and knowledge in supporting resources in Puskesmas Batua. The study showed a relationship between organizing functions and health workers’ performance in Puskesmas Batua at Makassar city. Good staff arrangement helps in objective arrangement by allocating its function and responsibilities\(^12\). There was a significant relationship between actuating and controlling functions with health workers in Puskesmas Batua. Some respondents had implemented actuating functions in performing their tasks and certain procedures had led to limitation in their responsibilities. In this study, controlling functions is related on review activity of health services that had been implemented and act to improve the performances. Some respondents who implemented controlling functions felt there were no
any orders in their work. The assignment and schedule monitoring affected health workers’ performance in performing their duties and responsibilities provided in health services.

**Conclusion**

In conclusions, there existed a correlation between planning function, organizing function, actuating function and controlling function with health workers’ performance in Puskesmas Batua at Makassar city.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

4. Minister of Health Decree (Kepmenkes). information center of the Community Health Center by the end of June 2016.
7. Sulaiman, R - This year there are 10 Puskesmas who have passed... [Internet]. Jan27 2015. Available from: https://health.detik.com/read/2015/11/18/133406/307418
8. Rumengan DS, Umboh JM, Kandou GD. Factors related to the utilization of health services to participants of BPJS health at Puskesmas Paniki Bawah Mapanget Subdistrict Manado. JIKMU. 2015 Mar 3;5(2).
Integrated Health Post Visit Frequency for 3 Months Consecutively Towards Children Development in Puskesmas Working Area at Makassar City

Muh Iffah Nurhikmah¹, Burhanuddin Bahar¹, Djunaidi M. Dachlan¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study is to analyse integrated health post (Posyandu) visit frequency for 3 months consecutively towards children development in public health centre (Puskesmas) working area at Makassar city. This study used descriptive survey research and was conducted from March to April 2017 in Puskesmas working area at Makassar city. The sample sizes were 29 children aged between 24 months and 36 months. The primary data was obtained through questionnaires whereas the secondary data was obtained through Posyandu register books and children weight. The data was analysed using SPSS program. The univariate analysis was represented in form of frequency distribution for each variable. The result found 28 children (96.5%) had normal score for pre-screening developmental questionnaires and only a child (3.45%) had abnormal score for pre-screening developmental questionnaires based on children’s age. The child with abnormal development is born with low birth weight, exclusive breastfeed and incomplete vaccination. In additions, the child’s mother also had low education level background that contributed in poor children development.

Keywords: Children development; Posyandu visit frequency; pre-screening developmental questionnaires

Introduction

Early child period is a vital development phase in human lifespan¹. Approximately 200 million children worldwide fail in achieving cognitive development due to several factors such as poverty, insufficient care and poor health². Based on initial estimation from UNICEF’s Early Childhood Development Index (ECDI), 36.8% of children aged 3 and 4 years in low-income and middle-income countries, failed in basic cognitive and socioemotional skills based on reports from nearly 100 000³.

The first two years in children development is important phase which involved rapid development, adaption and consolidation in the brain structure and function which included peak growth in sensory, speech/language and higher cognitive functions⁴. The developmental delay is related with poor psycho-social, intellectual development and learning ability⁵. Besides, the children development is also affected by culture and biological factors. A study found language development in children was influenced by perinatal/postnatal and environment factors such as antenatal care (ANC), Apgar scores, birth weight, premature delivery, birth order, parental education, infants gender and family background related to language impairment⁶. Based on Basic Health Research (Riskesdas) in 2007 showed 74.5% children under 5 years old were weighed at least once during last 6 months, while 60.9% among children were weighed more than 4 times⁷. Meanwhile, 12 million children have children growth chart card. The pre-screening developmental questionnaires purpose is to monitor children development⁸. The aim of this study to analysed Posyandu visit frequency for 3 months consecutively towards children development in Puskesmas working area at Makassar city.

Methodology

Study Type

This study used descriptive survey research to
describe antenatal care visit frequency to Posyandu for 3 months consecutively towards children development in Puskesmas working area at Makassar city.

Location and Time

This study was conducted from March to April 2017 in Puskesmas working area at Makassar city.

Population and sample

The population in this study were all children aged between 24 months and 36 months who are in Puskesmas working area at Makassar city. The samples were obtained by using purposive sampling method. The samples were children aged between 24 months and 36 months who had ANC visit for 3 months consecutively which met the following criteria:

a) Mothers who have children aged between 24 months to 36 months.

b) Mothers who had ANC visit for 3 months consecutively.

c) Mothers whose children never been hospitalized in last 3 months.

d) Mothers whose children never been sick for more than 7 days.

e) Mothers who had children development growth chart card.

f) Willing to be respondents for this study.

Data collection

The primary data was obtained through questionnaires while secondary data was obtained through Posyandu register books and children’s weight.

Data Analysis

The data was analysed using SPSS program. The univariate analysis was represented in the form of frequency distribution from each variable.

Result and Discussion

Univariate Analysis

Based on Table 1, there were 29 respondents who had been involved in this study. More than half of respondents’ father aged between 21 years and 30 years and only 1 respondent’s father aged less than 21 years old. Meanwhile, 15 respondents’ mothers aged between 21 years and 30 years old and only 1 respondent’s mother aged between 41 years and 50 years. For education levels, 14 respondents’ fathers had completed their senior high school and 13 respondents’ mothers had completed junior high school. All mothers were housewives and 12 respondents’ fathers worked as entrepreneur.

Table 1. Distribution of respondent characteristics in Puskesmas working area at Makassar city

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Father</th>
<th>%</th>
<th>Mother</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 21 years</td>
<td>1</td>
<td>3.4</td>
<td>4</td>
<td>13.8</td>
</tr>
<tr>
<td>21-30 years</td>
<td>15</td>
<td>51.7</td>
<td>15</td>
<td>51.7</td>
</tr>
<tr>
<td>31-40 years</td>
<td>11</td>
<td>37.9</td>
<td>9</td>
<td>31.0</td>
</tr>
<tr>
<td>41-50 years</td>
<td>2</td>
<td>6.9</td>
<td>1</td>
<td>3.4</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>3</td>
<td>10.3</td>
<td>5</td>
<td>17.2</td>
</tr>
<tr>
<td>Junior high school</td>
<td>5</td>
<td>17.2</td>
<td>13</td>
<td>44.8</td>
</tr>
<tr>
<td>Senior high school</td>
<td>14</td>
<td>48.3</td>
<td>6</td>
<td>20.7</td>
</tr>
<tr>
<td>Diploma</td>
<td>2</td>
<td>6.9</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>Degree</td>
<td>2</td>
<td>6.9</td>
<td>1</td>
<td>3.4</td>
</tr>
<tr>
<td>Master</td>
<td>3</td>
<td>10.3</td>
<td>1</td>
<td>3.4</td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil servants</td>
<td>3</td>
<td>10.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Private sector employee</td>
<td>3</td>
<td>10.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>4</td>
<td>13.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>12</td>
<td>41.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Informal</td>
<td>7</td>
<td>24.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Housewife</td>
<td>-</td>
<td>-</td>
<td>29</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100.0</td>
<td>29</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As shown in Table 2, there were 28 respondents (96.55%) had normal score and 1 respondent (3.45%) had abnormal score. Children with normal scores for pre-screening developmental questionnaires aged between 24 months and 29 months were 17 respondents (60.7%) and aged between 30 months and 36 months were 11 respondents (39.3%). Meanwhile, 1 respondent (100.0%) aged between 30 months and 36 months had abnormal score for pre-screening developmental questionnaires.
Table 2. Distribution category of total score of pre-screening developmental questionnaires based on children’s age in Puskesmas working area

<table>
<thead>
<tr>
<th>Score category</th>
<th>Children age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 months -29 months</td>
<td>30 months – 36 months</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Normal</td>
<td>17</td>
<td>60.7</td>
</tr>
<tr>
<td>Abnormal</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on Table 3, only 1 respondent (100.0%) had scored 66.67 for fine motor skill. There were 18 respondents (64.3%) aged between 24 months and 29 months who scored 100.0 and 10 respondents (35.7%) aged between 30 months and 36 months had scored 100.0. Besides, 1 respondent (100.0%) aged between 24 months and 29 months had scored 0 and 66.67 in gross motor skill on pre-screening developmental questionnaires. Meanwhile, 16 respondents (59.3%) aged between 24 months and 29 months had scored 100.0 and 11 respondents aged between 30 months and 36 months (40.7%) had scored 100.0 in gross motor skill for pre-screening developmental questionnaires as shown in Table 4. In additions, 5 respondents (100.0%) aged between 30 months and 36 months had scored 75.00 in speech and language development. There were 18 respondents (75.0%) aged between 24 months and 29 months had scored 100.00 and 6 respondents (25.0%) aged between 30 months and 36 months had scored 100.0 in speech and language development for pre-screening developmental questionnaires based on Table 5. As shown in Table 6, 3 respondents (100.0%) aged between 24 months and 29 months had scored 66.67 on social and independence development. There were 15 respondents (57.7%) aged between 24 months and 29 months had scored 100.00 and 11 respondents (42.3%) aged between 30 months and 36 months had scored 100.00 on social and independence development for pre-screening developmental questionnaires.

Table 3. Distribution of pre-screening developmental questionnaire score for fine motor skills based on children’s age in Puskesmas working area

<table>
<thead>
<tr>
<th>Fine motor skill scores</th>
<th>Children age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 months -29 months</td>
<td>30 months – 36 months</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>66.67</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>100.00</td>
<td>18</td>
<td>64.3</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4. Distribution of pre-screening developmental questionnaire score for gross motor skills based on children’s age in Puskesmas working area

<table>
<thead>
<tr>
<th>Gross motor skill scores</th>
<th>Children age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 months -29 months</td>
<td>30 months – 36 months</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>00</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>66.67</td>
<td>1</td>
<td>100.0</td>
</tr>
<tr>
<td>100.00</td>
<td>16</td>
<td>59.3</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>
**Table 5. Distribution of pre-screening developmental questionnaire score for speech and language development based on children’s age in Puskesmas working area**

<table>
<thead>
<tr>
<th>Speech and language development scores</th>
<th>Children age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 months -29 months</td>
<td>30 months – 36 months</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>75.00</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>100.00</td>
<td>18</td>
<td>75.0</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 6. Distribution of pre-screening developmental questionnaire score for social and independence development based on children’s age in Puskesmas working area**

<table>
<thead>
<tr>
<th>Social and independence development scores</th>
<th>Children age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 months -29 months</td>
<td>30 months – 36 months</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>66.67</td>
<td>3</td>
<td>100.0</td>
</tr>
<tr>
<td>100.00</td>
<td>15</td>
<td>57.7</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

**Overall Discussion**

The pre-screening developmental questionnaire is an early detection instrument for children’s development aged 0 until 6 years old. The results found that most children had normal development and only a child had abnormal development based on pre-screening developmental questionnaires. A child with abnormal development had incomplete vaccination, exclusive breastfeeding and low birth weight. Family support also contributed in children development which included personal social, language and motor skills.

The fine motor skills involved small muscles in the fingers, hand and arm able to manipulate, control and use material and tools. The results found 28 children had scored 100.00 for fine motor skills. Fine motor skills lead children to be creative like cutting paper with straight cut, sewing, drawing and coloring. In China, a study found children in rural areas had better fine motor skills in term of drawing, cutting and folding than children in urban areas. Meanwhile, gross motor skill require large muscles in the arm, legs and torso in walking, running and jumping. In this study, 27 children had scored 100.0 and a child had scored 0.00 for gross motor skills. Based on this study, the child was not able to stand without help. The main factor contributed in children motor development is physical activities involvement. The games and activities lead motor skills to develop more rapidly.

There were 24 children who had scored 100.00 for speech and language development. The speech and language development involved listening, recording words, understanding and speaking by using appropriate word in certain situation. Meanwhile, 26 children had scored 100.00 for social and self-dependent development. This development included eating, wearing clothes and bathing without parents’ help. The cognitive development is also important in social learning for children to express their feeling and behaviour. Besides, family bonding also influenced the social and emotional development among children. The family bonding is reduced if the child had experienced abused.
**Conclusion**

In conclusions, most children had normal score for pre-screening developmental questionnaires and only a child had abnormal score for pre-screening developmental questionnaires based on children’s age. The child with abnormal development is born with low birth weight, exclusive breastfeed and incomplete vaccination. In addition, this child’s mother has low education level background which also contributed to poor children development.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Effect of Musculoskeletal Ergonomics Chair on Silver Smith in Borong Villages, District Maggala, Makassar City

Muhammad Azrul Syamsul¹, Syamsiar S. Russeng¹, Fridawaty Rivai¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

This research aimed to determine the effect of ergonomic chair on silversmith craftsmen who have musculoskeletal complaint when they are working. This study was a quasi-type experiment, with the design of preventive intervention based on 16 respondents from Borong Village. The results indicated that the ergonomic chair have an effect on musculoskeletal complaint on the silver craftsmen while working. The group who have complaint on intervened musculoskeletal; neck (p=0.023), lower neck (p=0.016), right shoulder (p=0.01), back side (p=0.01), upper arm (p=0.011), waist (p=0.009) lower waist (p=0.009), buttock (p=0.008), right forearm (p=0.011), right wrist hand (p=0.009), right thigh (p=0.008), right knee (p=0.015), right calf (p=0.009). While in the group who do not have complaint on the intervened musculoskeletal, the ergonomic chairs do not give negative effect on the intervened muscle; neck (p=0.655), lower neck (p=0.257), back side (p=0.564), right upper arm (p=1.00), waist (p=0.157), right forearm (p=1.00), right wrist hand (p=0.655), and right calf (p=0.317). On working posture, ergonomic chair gives effect on the working group who has on musculoskeletal complaints with the value of (p=0.011), and to the group who do not have musculoskeletal complaint with the value of (p=0.024).

Keywords: Ergonomic chair; Musculoskeletal; silversmith craftsmen; working posture.

Introduction

Musculoskeletal disorders are common phenomena experienced by workers who do manual work¹. Musculoskeletal complaints are complaint on the skeletal muscle sections felt by a person ranging from very mild to very painful complaints. Study by Niu et al², suggested for the improvement of work productivity, the work must be done by meeting the requirements of safety and health to avoid work discomfort, health problems, illness and accidents. The problem is also caused by the imbalance between the workload with the capacity or workability of the workers. Arfiasari³ found that there is a relationship between work posture and workers’ productivity. The value of work posture in high-risk categories requires immediate action because the higher the risk level of work posture, it can increase musculoskeletal complaints that greatly affect productivity. Similarly, Frizka et al⁴, showed there is a strong relationship between musculoskeletal complaints with age, work period, work attitude sitting and work posture⁴. Therefore, an ergonomic condition and facility is needed for the workers to be more productive.

Research conducted by Kristanto et al⁵, related to the design of tables and chairs on cutting stations in a more ergonomic manner for small industry that can increase work productivity. Based on the implementation, a comparison of initial and final conditions is obtained; conditions before design, standard time and standard output were 9.068 seconds / unit and 396 units / hour. After design, standard time and standard output are 7.377sec / unit and 468 units / hour. That is an increase in output of 72 units / hour, productivity of 18.8%. Faulty seating due to seats that are incompatible with the anthropometry of the body, or due to positioning errors, can add pressure to the lower back and is a major cause of back problems⁶.

In South Sulawesi precisely in the city of Makassar there are many gold and silver craftsmen one of which is located in Kelurahan Borong. In the preliminary field study most of the work attitude of the silver and gold craftsmen is the static working attitude of sitting on a
chair facing the table and the back bending, the right foot is used to press the stove pump for brazing jewellery products. This work is done for an average of 8-9 hours/day and stands once to take something that is needed.

This research requires a good health handling. From the initial discussion that the researcher had with one of the gold craftsmen in Borong Manggala sub-district, Makassar, the researcher concluded that the craftsmen often experience back pain due to the work position that requires bending, and this condition is worsened by a work chair that does not have a backrest and does not fit the work table. Hence the bending condition is inevitable in this line of work. Therefore, the researcher intended to examine the influence of the work chair design on musculoskeletal complaints on gold and silver craftsmen in Manggala sub-district of Makassar city.

Methodology

Research Type

The type of research to be used is Quasi Experiment. The approach taken in this study is preventive intervention, whereby it attempted to study the relationship of risk factors to the incidence of a disease, by giving treatment or manipulation of exposure to these risk factors on the subject. In this case, the improvements of chair design work. The design of this study used the design of retreatment (One group pre-test and post-test design). Although in this research, there are two groups:

1. Working groups with musculoskeletal complaints at work, where this group will see a positive effect of ergonomic chair on musculoskeletal complaints and work attitudes at work.

2. Working group with no musculoskeletal complaints, where this group will see whether there is a negative effect of giving the work chair against musculoskeletal complaints and work attitude at work.

Location and Time

This research was conducted in home industry which engaged with silver artisans in Manggala sub district. Manggala sub-district was chosen to be the location of research because this location is the center of silver artisans in Makassar City. The research and intervention data collection plan was conducted in September -October 2016.

Research Subjects

In accordance with our sampling technique the number of samples examined is 16 people consisting of two groups of 8 persons each, in which one group is a group with specified muscle and skeletal complaints aimed at measuring the effect of giving the chair to the musculoskeletal complaints of workers. While group 2 is a group that is categorized as having no complaints on skeletal muscle that will be intervened while working, which aimed to measure and see the effect of seats on non-complaining workers so that this group can determine whether this chair can be used for all silver craftsmen or can only be used on silver craftsmen who encounter musculoskeletal complaints.

Research Instrument

Musculoskeletal complaints is determined using the Nordic Body Map method (NBM) to estimate the type and level of skeletal muscle complaints felt by workers. Researchers also use the RULA method because the work done by silver craftsmen is a work done by sitting. The equipment used in this measurement consists of a stopwatch, a camera, a bow and a scale.

Data Collection

The work flow included pre-test data collection, provision of designed chairs to both groups, taking post-test data for each group. This is followed by comparing the pre-test and post-test data of NMB and RULA per group.

Data Analysis

Data processing was done using SPSS program. The statistical test that was used to analyse the data from each measurement is based on the research design, simple allocation and measurement scale. The data of research results is analysed using inferential statistics.7

Results

Table 1 presented the distribution of data of skeletal muscle complaints that were intervened in the complaining group. All together there were 13 parts of the body have been examined. Based on the results shown in the table, H<sub>0</sub> is rejected for the entire 13 hypothesis which indicated that the ergonomic chair did make a difference in the users who complained of musculoskeletal pain.
Table 1. Statistical distribution of skeletal muscle that were intervened in the complaining group

<table>
<thead>
<tr>
<th></th>
<th>Before giving the seat</th>
<th>After giving the seat</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average value</td>
<td>Standard deviation</td>
<td>Average value</td>
</tr>
<tr>
<td>Neck</td>
<td>3.50</td>
<td>0.535</td>
<td>2.5</td>
</tr>
<tr>
<td>Lower neck</td>
<td>3.75</td>
<td>0.463</td>
<td>2.38</td>
</tr>
<tr>
<td>Right shoulder</td>
<td>3.88</td>
<td>0.354</td>
<td>1.38</td>
</tr>
<tr>
<td>Back</td>
<td>3.88</td>
<td>0.354</td>
<td>1.50</td>
</tr>
<tr>
<td>Upper right arm</td>
<td>3.75</td>
<td>0.463</td>
<td>1.75</td>
</tr>
<tr>
<td>Waist</td>
<td>4.00</td>
<td>0</td>
<td>1.62</td>
</tr>
<tr>
<td>Below the waist</td>
<td>3.38</td>
<td>0.518</td>
<td>1</td>
</tr>
<tr>
<td>Buttocks</td>
<td>3.25</td>
<td>0.463</td>
<td>1.25</td>
</tr>
<tr>
<td>Right arm down</td>
<td>3.5</td>
<td>0.535</td>
<td>1.62</td>
</tr>
<tr>
<td>Right wrist</td>
<td>3.38</td>
<td>0.518</td>
<td>1.75</td>
</tr>
<tr>
<td>Right thigh</td>
<td>3.88</td>
<td>0.354</td>
<td>1.88</td>
</tr>
<tr>
<td>Right knee</td>
<td>3.50</td>
<td>0.535</td>
<td>2.25</td>
</tr>
<tr>
<td>Right calf</td>
<td>3.25</td>
<td>0.463</td>
<td>1.62</td>
</tr>
</tbody>
</table>

The distribution of data of skeletal muscle intervention in the non-complaining craftsmen is tabulated in Table 2. The same body parts were compared and it was found that $H_0$ were rejected for five different body parts which were right shoulder, below the waist, buttocks, right thigh and right knee. The rejected $H_0$ proved that the usage of ergonomic had prevented or reduced pain in those five muscles of the craftsmen’s body.

Table 2. Statistical distribution of skeletal muscle that were intervened in the non-complaining group

<table>
<thead>
<tr>
<th></th>
<th>Before giving the seat</th>
<th>After giving the seat</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average value</td>
<td>Standard deviation</td>
<td>Average value</td>
</tr>
<tr>
<td>Neck</td>
<td>1.38</td>
<td>0.518</td>
<td>1.25</td>
</tr>
<tr>
<td>Lower neck</td>
<td>1.75</td>
<td>0.463</td>
<td>1.38</td>
</tr>
<tr>
<td>Right shoulder</td>
<td>1.88</td>
<td>0.354</td>
<td>1.25</td>
</tr>
<tr>
<td>Back</td>
<td>1.38</td>
<td>0.518</td>
<td>1.25</td>
</tr>
</tbody>
</table>
Cont.. Table 2. Statistical distribution of skeletal muscle that were intervened in the non-complaining group

<table>
<thead>
<tr>
<th>Muscle Location</th>
<th>Mean</th>
<th>SD</th>
<th>Mean</th>
<th>SD</th>
<th>p-value</th>
<th>H₀ Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper right arm</td>
<td>1.38</td>
<td>0.518</td>
<td>1.38</td>
<td>0.518</td>
<td>p = 1.00 &gt; 0.05 ; H₀ accepted</td>
<td></td>
</tr>
<tr>
<td>Waist</td>
<td>1.50</td>
<td>0.535</td>
<td>1.25</td>
<td>0.463</td>
<td>p = 0.157 &gt; 0.05 ; H₀ accepted</td>
<td></td>
</tr>
<tr>
<td>Below the waist</td>
<td>1.88</td>
<td>0.354</td>
<td>1</td>
<td>0</td>
<td>p = 0.008 &lt; 0.05 ; H₀ rejected</td>
<td></td>
</tr>
<tr>
<td>Buttocks</td>
<td>1.88</td>
<td>0.354</td>
<td>1.25</td>
<td>0.463</td>
<td>p = 0.025 &lt; 0.05 ; H₀ rejected</td>
<td></td>
</tr>
<tr>
<td>Right arm down</td>
<td>1.50</td>
<td>0.535</td>
<td>1.50</td>
<td>0.535</td>
<td>p = 1.00 &gt; 0.05 ; H₀ accepted</td>
<td></td>
</tr>
<tr>
<td>Right wrist</td>
<td>1.62</td>
<td>0.518</td>
<td>1.50</td>
<td>0.535</td>
<td>p = 0.665 &gt; 0.05 ; H₀ accepted</td>
<td></td>
</tr>
<tr>
<td>Right thigh</td>
<td>1.88</td>
<td>0.354</td>
<td>1.38</td>
<td>0.518</td>
<td>p = 0.046 &lt; 0.05 ; H₀ rejected</td>
<td></td>
</tr>
<tr>
<td>Right knee</td>
<td>1.88</td>
<td>0.354</td>
<td>1.38</td>
<td>0.518</td>
<td>p = 0.046 &lt; 0.05 ; H₀ rejected</td>
<td></td>
</tr>
<tr>
<td>Right calf</td>
<td>1.75</td>
<td>0.463</td>
<td>1.50</td>
<td>0.535</td>
<td>p = 0.319 &gt; 0.05 ; H₀ accepted</td>
<td></td>
</tr>
</tbody>
</table>

The average value of the work posture before the ergonomic chair is 4.88 with the standard deviation of 0.641 and after the use ergonomic chair, it was 3.75 with the standard deviation 0.463 while the p value = 0.024 which is smaller than 0.05, then H₀ is rejected. It can be concluded that there is a difference in posture before the ergonomic chair and after the ergonomic chair. It can also be concluded that there is an effect of giving ergonomic chair to the work posture of silver craftsmen.

Overall Discussion

From the results of the research conducted, the ergonomic chair made the craftsmen feel comfortable compared with the previous seat. This is in line with research conducted by Murrell⁸ where the respondent was an employee and the findings proved that a chair in accordance with the body shape of a sitting person can provide comfort and not strain the person who occupies it. Providing ergonomic chairs can reduce skeletal muscle complaints on silver craftsmen, in agreement with research conducted by Purnomo, et al⁹, where this experimental result of intervention with ergonomics approach can reduce musculoskeletal complaints by 87.8%, reduce fatigue by 77.5%, reduce workload by 21.55%, reduce the risk of injury at work by 10.65% and increase work productivity by 59.49%. The research conducted by Wulandari¹⁰, with a sample of 25 female workers in the batik industry, where the results of that study found there were differences in average musculoskeletal complaints before and after ergonomic chair.

Conclusion

1. Giving an ergonomic chair can reduce musculoskeletal complaints while working for silver craftsmen who have musculoskeletal complaints.

2. Provision of ergonomic chairs do not negatively impact workers who do not experience complaints, as this seat can also be used by craftsmen who do not experience musculoskeletal complaints.

3. The use of ergonomic chairs can reduce the angle of the craftsman posture (work posture value) formed at work, so that it can reduce musculoskeletal risk.

4. All craftsmen can use the ergonomic chair by taking into account the size of the user’s body.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

2. Niu S. Ergonomics and occupational safety and


5. Kristanto A, Saputra DA. Desk Design and Ergonomic Workstation at Cutting Work Station as Effort to Increase Productivity.


Effect of Skill, Compensation and Job Satisfaction on the Nurses Performance at Emergency Unit in Anutapura General Hospital Palu 2016

Munawarah¹, Alimin Maidin¹, Indahwaty Sidin¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The emergency department (ED) is considered as one of the most stressful and hectic department of a hospital because trauma comes in unexpectedly and in all kinds of scenarios. Therefore, usually the nurses and doctors working in this department need to be highly skilled and quick-witted. Taking into account these factors, this research aimed to investigate the effect of skills, compensation and work satisfaction on nurses’ performance in Emergency Unit of Anutapura General Hospital of Palu in 2016 is studied. The research was an analytical survey using quantitative study. The samples were the civil servant of Anutapura General Hospital of Palu consisting of 45 people. They were selected using census technique. The data were processed using SPSS program with multiple linear regression analysis. The results of the research indicated that skill, compensation and work satisfaction simultaneously affect the nurses’ performances in Anutapura General Hospital of Palu. The most dominant variable on nurses’ performances is compensation.

Keywords: Compensation; performance; skill; work satisfaction.

Introduction

Human resources are a basic element of every company, because human resources are the makers of goals, innovation, communication and strategy for the company¹. Thus, the success of an organization is strongly influenced by the level of employees’ performances. Because of the importance of employees’ performances in the achievement of corporate goals, it is necessary efforts by the company to improve employee’s performances, such as work skills, compensation and job satisfaction².

One of the factors that affect employee performance in nursing department is job skill. A nurse’s skills can be seen when the nurse performs a nursing action in accordance with the applicable Standard Operating Procedures (SOP). In addition, the nurse’s work skills can be seen from the nurse’s competence test³. Some of the literature emphasized the importance of individual skills, which include communication skills and team work skills as factors that play a role in organizational productivity and are an organizational form expected by the worker⁴.

Work skills are a person’s ability to accomplish tasks assigned to them. Skills here include technical skills, human skills, conceptual skills, such as the ability to take advantage of opportunities and accuracy⁵. Compensation is the overall remuneration received by employees as a result of the execution of employment in the organization in the form of money or other, which may include salaries, wages, bonuses, incentives and health benefits, holiday allowances, meal allowances, leave money and others. Compensation can be provided in various forms, such as in the form of giving money, the provision of materials and facilities, and in the form of giving career opportunities. The above payments are directly related to performance such as wages or salaries, bonuses and commissions which are not directly linked to performance in an effort to improve employees’ comfort and satisfaction such as benefits⁶.
The impact of a fair, decent and understandable compensation system by all employees, and controllable will build employee’s perceptions of the organization as a place to work and develop. The compensation given should be fair and reasonable in accordance with the performance of each employee is very influential on the level of employees’ satisfaction, control of the implementation of this compensation system through performance appraisal, so as to maintain the stability of employee motivation in achieving optimal performance. One of the important means of human resource management in an organization is the creation of employee job satisfaction. Job satisfaction is basically one of the psychological aspects that reflects one’s feelings toward his/her work, he/she will feel satisfied with the suitability of his ability, skills and expectations with the work he/she is facing.

Shahab et al. stated that effective leadership and job satisfaction are two factors that are considered the basis of a successful organization. Employees with high job powers tend to exert more effort in their tasks and pursue the interests of the organization. Based on the study problems and the results of previous researches, this study is interested to conduct a research on “The Influence of work skills, compensation and job satisfaction on the performance of nurses in emergency department of Anutapura General Hospital in Palu City”.

Methodology

Research Type

The type of research used in this study is quantitative method. Data collected in the form of statements or numbers will be analyzed by statistical methods to facilitate in interpreting each research variable. The data has been collected and then analyzed quantitatively by using descriptive or inferential statistics so that it can be concluded that the hypothesis formulated is proven or not. Survey method is used to have a better understanding about phenomenon that happened in an organization and by using research of survey method the researcher want to know the factors that influence the work skills and compensation and job satisfaction of nurses’ performance at emergency department of Anutapura General Hospital in Palu City.

Location and Time

The location of this study is at the emergency department of Anutapura Hospital of Palu City and this study was conducted from Jan 2016 to July 2016.

Population and sample

The population in this study were nurses at the emergency department of Anutapura Hospital, which is about 45 people. In this research no sampling technique is used because the whole of the population is analyzed by using the census method. It is with the consideration of the population of only 45 nurses, it is feasible to be taken overall to be sampled without having to take samples by random sampling technique in a certain amount.

Data Collection

The data used in this research were primary data and secondary data obtained from several source that is, results of interview and result of questionnaire given to nurse at emergency room department of Anutapura General Hospital.

Data Analysis

In this research, the researcher managed data with data analysis method using SPSS software. The collected data was analysed through bivariate analysis to see the relationship and the influence of independent variable to dependent variable by using Chi square test and see p-value and followed by logistic regression analysis.

Result And Discussion

Bivariate Analysis

Influence of work skills

The effect of work skills on nurse’s performance, in this study is listed in Table 1. According to the respondents’ response that if the nurse has good working skills then performance will tend to be good and this is evidenced by the high nurse work skills to good performance as many as 22 people (78.57%). Conversely, if the work skills are low, nurses tend to have poor performances. This is indicated by the high number of respondents who have low job skills and less good performances as many as 10 people (58.82%). The probability value (ρ value) = 0.011, <α = 5%, which means that there is influence between nurses’ work skills and their performance.
Table 1. Impact of performance skills on nurses’ performances

<table>
<thead>
<tr>
<th>Work skills</th>
<th>Nurses’ performance</th>
<th>Total</th>
<th>%</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>%</td>
<td>Less good</td>
<td>%</td>
</tr>
<tr>
<td>High</td>
<td>22</td>
<td>78.57</td>
<td>7</td>
<td>41.18</td>
</tr>
<tr>
<td>Low</td>
<td>6</td>
<td>21.43</td>
<td>10</td>
<td>58.82</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

Effect of compensation

The effect of compensation on the performance of nurses in this study is listed in Table 2. Responses from some nurses stated that although the compensation received is low, it does not affect the performance of nurses. This is reflected on the high number of nurses having good performance as many as 21 people (75%). On the contrary, the opinion of some nurses stated that if the compensation received is low, then the performance will tend to be less good, which is proven by the high number of nurses who have bad performance as many as 10 people (58.82%). The probability value (ρ value) = 0.023 <α 5%, whereby it signified that there is influence between compensation and nurses’ performance.

Table 2. Influence of compensation on nurses’ performances

<table>
<thead>
<tr>
<th>Compensation</th>
<th>Nurses’ performance</th>
<th>Total</th>
<th>%</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>%</td>
<td>Less good</td>
<td>%</td>
</tr>
<tr>
<td>Suitable</td>
<td>21</td>
<td>75</td>
<td>7</td>
<td>41.18</td>
</tr>
<tr>
<td>Not Suitable</td>
<td>7</td>
<td>25</td>
<td>10</td>
<td>58.82</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

Effect of Job Satisfaction

The effect of job satisfaction on nurses’ performance is presented in Table 3. According to the responses of some nurses, the higher the job satisfaction they feel or accept, the better their performances are. This statement is confirmed by 23 nurses (82.14%). On the contrary, the opinion of some nurses stated that if job satisfaction is low, it does not guarantee good performance. This can be proven by 10 nurses who have low job satisfaction and poor performance. The probability value (ρ value) = 0.005 <α = 5%, which means that there is influence between job satisfaction and nurses’ performances.

Table 3. Influence of job satisfaction on nurses’ performances

<table>
<thead>
<tr>
<th>Job Satisfaction</th>
<th>Nurses’ performance</th>
<th>Total</th>
<th>%</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>%</td>
<td>Less good</td>
<td>%</td>
</tr>
<tr>
<td>Satisfied</td>
<td>23</td>
<td>82.14</td>
<td>7</td>
<td>41.18</td>
</tr>
<tr>
<td>Not Satisfied</td>
<td>5</td>
<td>17.86</td>
<td>10</td>
<td>58.82</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>

Overall Discussion

This result is consistent with the statement of Ologunde et al\textsuperscript{11}, that the implementation of a fair and reasonable compensation system will prevent employee intent to turnover. The results of this study are in line with what has been done by Cordeiro et al\textsuperscript{12}, that compensation is one of the determinants of performance. In particular, Lovelace et al\textsuperscript{13}' study also explained that in addition to compensation, leadership and physical work environment also contributed significantly to improved performance.
Job satisfaction is also important for actualization. Employees who do not get job satisfaction will never achieve psychological maturity. In turn it will be frustrating. Job satisfaction and staff motivation can be improved by doing job enrichment, job enlargement, job rotation, participation, and quality of work life.

**Conclusion**

Based on the results of this work, the following conclusion has been made. First, the job skills have positive and significant impact on nurses’ performance at the emergency department of Anutapura Palu General Hospital. Second, the compensation received positively and significantly influenced the performance of nurses. Third, job satisfaction has a positive and significant effect on the performance of nurses.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

The Effect of Soybean Milk and Probiotic Drink on Total Cholesterol in Hypercholesterolemia Women in Makassar City

Nina Pratiwi N.D¹, Ida Leida Maria¹, Saifuddin Sirajuddin¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of the research was to determine the effect of soybean milk and probiotic drink and their combination on the decrease of total cholesterol content in hypercholesterolemia women. The subjects of the research were women ranging from 30 to 60 years old with a total cholesterol content of 201-346 mg/di. The research subjects were divided into three groups, i.e. group I was given soybean milk (19 people); group II was given probiotic drink (19 people), and group III was given the combination of soybean milk and probiotic drink. The samples were supplied for four weeks. The results of statistical analysis indicate that there is a decrease of cholesterol content on the subjects having been given soybean milk, probiotic drink, and the combination of soybean milk and probiotic drink. The combination given for four weeks can decrease cholesterol total content. However, there is no difference among soybean milk, probiotic drink, and the combination of soybean milk and probiotic drink.

Keywords: Probiotic drink; Soybean milk; Total cholesterol; Women.

Introduction

The development of world civilization is marked by the increasing status of human welfare and advanced science, especially in the medical world where health problems today are not only caused by infectious diseases but health problems began to be taken over by non-communicable diseases such as cancer, diabetes, hypertension and disease cardiovascular events such as coronary heart disease and stroke. Anwar¹ showed that the risk of atherosclerosis or CHD will increase if blood cholesterol levels rise. It has also been shown that lowering blood cholesterol levels can reduce the risk. Hypercholesterolaemia is one of the risk factors of Coronary Heart Disease and also the risk factors for death at younger ages according to World Health Organization (WHO) report in 2002, as many as 4.4 million deaths due to CHD due to hypercholesterolaemia or 7.9% total death at a young age².

In Indonesia, the proportion of abnormal cholesterol in 2013 at age ≥ 15 years is 35.9%, and the proportion of abnormal cholesterol by gender at age ≥ 15 years by 30% male and 39.6% female¹. Women in pre-menopausal period will experience a decrease in estrogen hormones where the hormone estrogen works to lower blood serum cholesterol so that the risk of high cholesterol. As for residence, the proportion of abnormal cholesterol at age ≥15 years was higher in urban areas (39.6%) than in rural areas (32.1%)³.

Most people prefer to overcome the problem of hypercholesterolemia with synthetic drugs that are lowering cholesterol levels of the body⁴. However, these drugs are expensive because their raw materials are still imported. In the early stages, non-pharmacological treatments such as diet and exercise are preferred, but if these non pharmacologic therapies fail, pharmacologic therapy is performed, using both traditional and modern medicine. However, the prevention of drugs has low success rates because of the high discipline required. Almost 70% of hypercholesterolemia patients in Indonesia fail to achieve the target of cholesterol levels according to the treatment guidelines⁴.

Soy is one of the most abundant vegetable sources in Indonesia and it is potential to be developed as a health food beverage for people with hypercholesterolaemia. Soybeans contain isoflavone bioactive components that are beneficial to health. Isoflavones have non-
steroidal and antioxidant phytoestrogens that have the potential to protect hormone-dependent diseases such as breast cancer, prostate cancer, menopausal syndrome, hypercholesterolaemia and osteoporosis. Jenkins found that postmenopausal women given soy isoflavone diet significantly lowered total blood cholesterol.

Lin showed that chemical components in soybeans can also lower blood cholesterol levels, thereby reducing the risk of coronary heart disease. Soybeans (Glycine max L.) contain chemical components, including: protein, isoflavones, niacin, and dietary fiber that are reported to lower blood cholesterol levels. In addition the nutritional value of soy essence is almost the same as cow’s milk.

In addition to soy milk, probiotics also benefit on the decrease in cholesterol levels. Probiotics are microbes that provide health benefits to the host through its effects in the intestinal tract. Probiotics play a role in lowering cholesterol through bile acid deconjugation and through binding of cholesterol by bacteria. The results from Ataie-Jafari stated that giving 300 grams of probiotics daily for 6 weeks can lower total cholesterol and LDL and increase HDL.

The result of Chiu research found that fermented soy milk gives cholesterol reduction effect, higher than soybean milk in hamster animal. Isoflavones in fermented soy milk in the form of its smaller (molecule) aglclone (genestein), resulting in faster absorption. The isoflavon absorption of fermented soy milk is faster than that of controversal soy milk.

Aggarwal noted that there is no difference in the reduction of cholesterol from soygurt with a combination of soy milk and probiotics. Based on this background, in this work, the authors have examined the effects of soy milk, probiotic drinks on the decrease in total blood cholesterol levels in housewives at some puskesmas in Makassar City 2014.

**Methodology**

**Research Type**

The type of this research is Quasi Experimental research with nonrandomized Pre-Post Test Control Group Design model. This design is also known as nonequivalent control group design.

**Location and Time of Study**

This research was conducted at Mamajang Community Health Center and MacciniSawah Community Health Center. The reason for choosing the research site is because the clinic has cholesterol examination so it can identify housewife who has high cholesterol level. The time of study was 2 months, ie from May-July 2014.

**Population and Sample**

The populations in this study were housewives in several puskesmas in Makassar City. The sample of this research is part of housewife in several health centers of Makassar City that meet the following criteria of aged between 30-60 years with cholesterol levels more than normal cholesterol levels (> 200 mg / dl). The sample set for this work is 54 samples with estimated dropout of 10 %. The sample of research is divided into 3 groups, that is group I is housewife who get soy milk. Group II is a housewife who gets a probiotic drink. Group III is a housewife who gets soy milk and probiotic drinks.

**Treatment Method**

Panelists are divided into three groups: Group I is given 1 cup of soy milk (175 mL) twice daily (morning and night). Group II is given 1 bottle of probiotic drink containing probiotic bacteria 108 colonies (65 mL) 2 times a day (morning and night). Group III is given 1 cup glass of soy milk (175 ml) and 1 bottle of probiotic (65 ml) drink twice daily (morning and night). The researcher came to each sample house and gave treatment twice a day (morning and night) for 1 month. In the second week, the total measurement of blood cholesterol by nurses. All measurements of nutritional status of research subjects were carried out in each Puskesmas by weighing BB using the scales of “Camry Digital” brand body and TB using height measuring instrument “MicrotoiseStaturmeter” before intervention and after intervention to calculate BMI, so the quality of measurement remains the same. Measurement of Food Frequency and Food Recall 24 hours was done at the time before the intervention and after intervention to obtain data about the frequency of consumption of a number of foodstuffs from the study subjects.

**Data Analysis**

Data processing is done by using computer program SPSS version 18. Bivariate analysis was conducted to
find out the correlation of independent variable and dependent variable by using statistical test. The results obtained were compared between before and after intervention with T paired sample test or Wilcoxon Signed Rank Test. Meanwhile, to compare the results between patients who received intervention of soymilk, probiotic drink intervention and intervention of soymilk and probiotic drink was done T unpaired sample test and Mann Whitney U Test. As for the conversion and regularity of treatment was done in the form of percentage comparison.

Result And Discussion

To test the difference of mean total blood cholesterol level before and after intervention of soymilk, probiotic drink and combination of both, paired T test. To perform paired T test then the data distribution should be normal. Normality test results can be seen in Table 1. Since P>0.05 it can be concluded that the distribution of treatment type data for each group has normal distribution so that ANOVA test can be done.

Table 1. Test Result Test Normality Type of Treatment

<table>
<thead>
<tr>
<th>Type of Treatment</th>
<th>Kolmogorov-Smirnova Statistic</th>
<th>df</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soy</td>
<td>.097</td>
<td>57</td>
<td>.200</td>
</tr>
<tr>
<td>Probiotics</td>
<td>.076</td>
<td>57</td>
<td>.200</td>
</tr>
<tr>
<td>Combination</td>
<td>.111</td>
<td>57</td>
<td>.079</td>
</tr>
</tbody>
</table>

Table 2 shows that in the soybean intervention group at the first measurement the mean value of cholesterol 229.37, the second measurement 180.95, and at the third measurement of 193.00. From ANOVA repeated test results obtained p value (0.000) <0.05 which means that there is difference in each measurement. Table 3 shows in the intervention group using probiotic drinks, for the first measurement of cholesterol mean values of 235.74, second measurement 167.74, and third measurement 196.63. From ANOVA repeated test results obtained each p value (0.000) <0.05 which means that there is a difference in each measurement. Table 5 shows that for the first measurement there is no average difference in the three intervention groups with p = 0.174 (p>0.05). For the second measurement there was no average difference in the intervention group with p = 0.464 (p>0.05). For the second measurement there was no average difference in the three intervention groups with p = value 0.276 (p>0.05).

Table 2. Results Average Comparison of Total Blood Cholesterol Levels before and After Intervention In Soy Intervention Group

<table>
<thead>
<tr>
<th>Soy Intervention</th>
<th>n</th>
<th>Mean+SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>19</td>
<td>229.37±18.67</td>
<td>0.000*</td>
</tr>
<tr>
<td>Second</td>
<td>19</td>
<td>180.95±35.67</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>19</td>
<td>193.00±34.33</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Average Comparison of Total Blood Cholesterol Levels Before and After Intervention in the Probiotic Intervention Group

<table>
<thead>
<tr>
<th>Combinasion Intervention</th>
<th>n</th>
<th>Mean+SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>19</td>
<td>235.74±30.86</td>
<td>0.000*</td>
</tr>
<tr>
<td>Second</td>
<td>19</td>
<td>167.74±59.66</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>19</td>
<td>196.63±50.29</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows the combined intervention groups of soybeans and probiotics, first measurements 235.74, second measurement 167.74, and third measurement 196.63. From ANOVA repeated test results obtained each p value (0.000) <0.05 which means that there is a difference in each measurement. Table 5 shows that for the first measurement there is no average difference in the three intervention groups with p = 0.174 (p>0.05). For the second measurement there was no average difference in the intervention group with p = 0.464 (p>0.05). For the second measurement there was no average difference in the three intervention groups with p = value 0.276 (p>0.05).

Table 4. Results Average Comparison of Total Blood Cholesterol Levels Before and After Intervention in Combination Intervention Groups

<table>
<thead>
<tr>
<th>Probiotic Intervention</th>
<th>n</th>
<th>Mean+SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>19</td>
<td>249.11±43.62</td>
<td>0.000*</td>
</tr>
<tr>
<td>Second</td>
<td>19</td>
<td>161.74±47.34</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>19</td>
<td>215.00±47.99</td>
<td></td>
</tr>
</tbody>
</table>
Table 5. Average Comparison of Total Cholesterol Amounts in Soy Intervention Groups, Probiotics and Combinations for First, Second and Third Measurements

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Type of intervention</th>
<th>Soy (mean±SD)</th>
<th>Probiotic (mean±SD)</th>
<th>Soy+ Probiotic (mean±SD)</th>
<th>P**</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Soy</td>
<td>229.37±18.67</td>
<td>249.11±43.62</td>
<td>235.74±30.86</td>
<td>0.174</td>
</tr>
<tr>
<td></td>
<td>Probiotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soy+ Probiotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td>Soy</td>
<td>180.95±35.67</td>
<td>161.74±47.34</td>
<td>167.74±59.66</td>
<td>0.464</td>
</tr>
<tr>
<td></td>
<td>Probiotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soy+ Probiotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>Soy</td>
<td>193.00±34.33</td>
<td>215.00±47.99</td>
<td>196.63±50.29</td>
<td>0.276</td>
</tr>
<tr>
<td></td>
<td>Probiotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Soy+ Probiotic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The housewives taken as research samples had initial cholesterol levels, the lowest 201 mg / dL (1 respondent) and the highest 346 mg / dL (1 respondent). The average initial cholesterol level for the 300 ml soybean-fed (K1) group was 229.37 ± 18.67 mg / dL, the group given 2 bottles of probiotics “Y” containing probiotics Lactobacillus casei strain Shirota 108 colonies / mL (K2) is 249.11 ± 43.62 mg / dL, while the combination group of soy milk and probiotics (K3) is 235.74 ± 30.86 mg / dL. This shows that generally the respondents used still include mild to moderate hypercholesterolemia. High grade hypercholesterolaemia if total blood cholesterol levels more than 240 mg / dL.

According to Gardner, a daily dose of 25 g protein from soy milk can lower LDL-cholesterol levels in adults who are high in LDL-cholesterol. Chen suggests that soy protein significantly lowers total cholesterol (17.2%). Taku suggests that soy protein significantly lowers total cholesterol. The results of Taku found that isoflavones total cholesterol serum blood and LDL-cholesterol. The main components in soy milk that play a major role in lowering cholesterol according to some researchers include: soy protein and isoflavones. The 1 g protein in soy milk contains 56 mg of total isoflavones. Ishimwe stated that probiotics are able to lower cholesterol through the mechanism of binding of cholesterol in the intestines by probiotic bacterial cell membranes and by deconstruction of bile salts into bile acids by enzymes produced by probiotic bacteria.

Consumption of combination of soy milk with probiotic drink (L.casei strain shirota) in this study showed no statistically significant differences with soy milk or probiotics in reducing total blood cholesterol levels, while Larkin found that combination of soybean and probiotics in respondents aged above 45 years of moderate hypercholesterolaemia decreased cholesterol 4.7 ± 2.0%. There are differences in the results are caused among others: the type of probiotics used, the dose of probiotics and soybeans, and the duration of administration.

Conclusion

This research aim to estimate the prevalence of under nutrition and Based on the results of research and discussion on the provision of soy milk, probiotic drinks and a combination of soy milk and probiotics in lowering total blood cholesterol levels, it can be concluded:

1. Provision of soy milk, probiotics, and its combination for 2 weeks can reduce total blood cholesterol levels.

2. Statistically, there is no difference in the provision of soy milk, probiotics, or a combination of total blood cholesterol levels.

Acknowledgment: The author would like to acknowledge the participants from Mamajang Community Health Center and MacciniSawah Community Health Center as well as Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


The Correlation between Birth Weight and the Essential Fatty Acid Levels in the Milk of Breastfeeding Infants Aged 1 to 4 Months in Makassar

Nur Nikmah Siradjuddin1, Veni Hadju1, Ida Leida Maria1
1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

This research aimed to examine the correlation between the birth weight and the higher level of essential fatty acids (AA and DHA) in the milk of the mother who breastfeed the 1 to 4 month infants in Makassar City. The research was conducted in the health Centers of Tamaumaung, Layang and Tamangapa. The research type was analytical observational using the cross sectional design. The 30 samples were chosen using the purposive sampling technique. The samples were divided into two groups: the first group constituted of 15 mothers who breastfeed the infants with the normal birth weights and the second group con essential fatty acid (AA and DHA) were examined using the High Performance Liquid Chromotography (HPLC) method. SPSS was utilized to analyze the data based on independent t-test in order to see the correlation between the birth weight of the infants and the levels of the essential fatty acid in the mother’s milk of the two groups. The research results indicated that the mean level of the AA milk in the infants with the normal birth weight was lower compared to that in the LBW infants (0.098 ± 0.006 mg/ml against 0.085 ± 0.024 mg/ml); the mean level of milk DHA in the infants with the normal birth weight was also lower compared to that in LBW infants (0.076 ± 0.005 mg/ml compared to 0.072 ± 0.007 mg/ml), but their correlation was not significant (p>0.05).

Keywords: Breastfeeding mothers; Breast milk; Essential fatty acid; LBW

Introduction

Breast milk is the most perfect food for babies. Naturally, every human being is prepared to have a pair of mammary glands that serve to produce milk or breast milk for the baby at the time after childbirth. Breast milk is a source of nutritional choices for infants, according to the World Health Organization (WHO), the American Academy of Pediatrics (AAP) and Canada Pediatric Society (CPS), ideally breastfeeding is the only source of nutrition for six months at the beginning of life. The composition of breast milk may change according to the baby’s nutritional needs at all times. Only breast milk is uniquely adapted to the needs of human infants. For example, for premature infants, breast milk has a high nitrogen content of milk produced by a mother of a term infant. The content of enzymes in breast milk that helps digestion, the immune substance that can prevent infants infected by the seeds of certain diseases, it cannot be replaced by formula milk. In addition, breastfeeding has psychological benefits for both infants and mothers.

Breastfeeding in infants in addition to improving health and intelligence optimally, also able to make potential children have a stable emotion, spiritual mature and have good social development. The advantages and benefits of breastfeeding can be seen from several aspects: nutrition, immunology, psychological, neurological, intellectual, economic, and postponed pregnancy. Breastfeeding will ensure the baby will be healthy to start life.

Infant growth and development is largely determined by the amount of breast milk obtained including energy and other nutrients contained in the milk. Breast milk...
without other food can meet the needs of baby’s growth at the beginning of life. After that, breast milk only serves as a source of protein, vitamins and minerals for babies who get additional food.

Breast milk composition is intended as baby nutrition. Breast milk also contains hundreds to thousands of different bioactive molecules in each mother to protect infants against infections, inflammation and contribute to immune maturation, organ development, and healthy microbial colonization. The composition of breast milk including the minerals contained therein may be affected by various factors such as maternal health and nutritional status, lactation phase and food intake.

Breastfeeding a mother specifically tailored to the needs of her own baby. The results showed that the fat and lactose content of breast milk in mothers who gave birth less than a month lower than breast milk in mothers who gave birth monthly, while the protein content significantly higher in infants less than months of mature enough. Besides breast milk also contains many essential fatty acids. Essential fatty acids are a component of all body tissues and are necessary for the synthesis of cell membranes. Some studies have shown that infants who get formula milk despite containing LA and ALA in the same composition in breast milk, DHA levels in the body tissue was lower than breastfed babies because the ability of babies to change LA and ALA to AA and DHA is still very limited. The results showed that there were differences in growth between breastfeeding infants and infant formula without DHA. However, the minimum amount of DHA contained in ASI is sufficient for optimum growth and development.

The presence of appropriate protective and nutrient factors in breast milk can ensure good baby’s nutritional status and morbidity and mortality rates may decrease. In order to reduce morbidity and mortality, UNICEF and WHO recommend that infants should be breastfed for at least 6 months. Based on Indonesia Demographic and Health Survey (SKDI) Survey 2007, the coverage of exclusive breastfeeding from 0-6 months showed an increase from 32% to 42% in 2012. Data from the Ministry of Health indicate coverage of exclusive breastfeeding in 2013 in infants 0-6 month in South Sulawesi was 66.5% higher than the national figure of 54.3%. The total amount of breast milk production and infant intake varies for each feeding time in the amount of between 450-1200 ml and the average between 750-850 ml per day. The amount of breast milk that comes from mothers who have malnutrition status can decrease to the number only100-200 ml per day. Breast of pregnant hormonal women and women who has breastfed, will be able to produce a lot of breast milk when the woman is relaxing.

Based on the above background plus the lack of research related to that in the city of Makassar, researchers interested in conducting research related to the birth weight relationship to the levels of essential fatty acids (AA and DHA) in breast milk from mothers breastfeeding infants aged 1-4 months in the city of Makassar.

Methodology

Research Design

The type of research used in this study is observational analytic that is, research is directed to explain the linkage of a situation or situation. In this study was directed to explain the relationship between birth weights with the levels of essential fatty acids in breast milk by comparing the levels of essential fatty acids in breastfeeding mothers with LBW infants who breastfeed babies with normal birth weight. The research design used is cross sectional where the research object is measured or collected simultaneously at the same time. In other words, data collection for this type of research, both independent variables and dependent variables were done together or at once.

Location and Time of Study

The research was conducted in three health centers in Makassar city, namely PatingalloangPuskesmas, PuskesmasLayang and Tamangapa Health Center. The study period starts in October 2015 until December 2015.

Population and Sample

The populations in this study were breastfeeding mothers whose babies were enrolled in PatingalloangPuskesmas, PuskesmasLayang and Tamangapa Health Center. The study sample was breastfeeding mothers who fulfilled the inclusion criteria. The way of subject selection is by purposive sampling method that is sample determination technique based on certain criterion. Total sample minimum is 30 people.
**Data Analysis**

In this work, questionnaire for characteristic and demographic data of the sample was used. All primary data from the results of the study were analyzed and calculated using SPSS. Bivariate analysis, using Independent t-Test to was done to analyze there a significant relationship between the 2 free groups of normal birth weight group and group with the average of essential fatty acid (AA and DHA) in breast milk.

**Ethical Considerations:** This study was conducted with the permission of the Ethical Committee of Faculty of Medicine Unhas No. Register UH 15110962.

**Result and Discussion**

The association of AA and DHA levels in breast milk based on the baby’s birth weight.

Results showed that infants of normal birth weight had a mean birth weight of 3086.67 grams and mean baby BBLR was 2186.33 grams. Furthermore, the comparison of AA and DHA levels in breast milk based on birth weight category showed different mean values, where the mean AA of ASI in the LBW group was higher at 0.098 ± 0.006 mg / ml than the normal group of 0.085 ± 0.024 mg / ml, but unrelated statistically with p value = 0.052 (p> 0.05). While DHA levels showed higher mean in LBW group with group mean of u 0.072 ± 0.007 mg / ml, but not related by p value 0.170 (P> 0.05).

Breast AA and DHA levels based on breastfeeding experience.

In Table 1, AA levels in breast milk were compared based on breastfeeding experience in breastfeeding mothers in the City showed no significant association between mothers who had breastfeeding experience and who did not have breastfeeding experience with AA levels in breast milk, this was also confirmed by p = 0.589 (> 0.05).

The level of DHA in breast milk in Table 2 compared with breastfeeding experience in breastfeeding mothers in Makassar City showed no significant relationship between mothers with breastfeeding experience and who did not have breastfeeding experience with breastfed DHA levels, this was also proved by the value of p = 0.052 (> 0.05).

<table>
<thead>
<tr>
<th>Breastfeeding Experience</th>
<th>AA levels in Breast Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 1. Average breastfeeding AA levels based on breastfeeding experience

<table>
<thead>
<tr>
<th>Breastfeeding Experience</th>
<th>DHA levels in Breast Milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 2. Average breastfeeding DHA levels based on breastfeeding experience

AA and DHA levels of breast milk based on nutritional status of breastfeeding mothers

Mean AA levels in breast milk Table 3 compared with maternal body mass index (IMT) at the time before pregnancy and at the time of breastfeeding showed no significant relationship with ASA AA levels, where p> 0.05. Furthermore, AA levels in breast milk that were related to the size of the upper arm circumference of the mother at the time of breastfeeding showed no significant relationship (p = 0.423).Mean levels of DHA in breast milk (Table 4), which were linked by maternal body mass index (IMT) at the time before pregnancy and BMI at breastfeeding showed no significant association with ASH DHA levels, where p> 0.05. Furthermore, levels of DHA in breast milk linked by maternal upper arm size (LLA) at breastfeeding showed no significant association (p = 0.165).
Table 3. The average breastfeeding AA level based on nutritional status of breastfeeding mothers

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>AA levels in Breast Milk</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI before pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>17</td>
<td>0.089</td>
<td>0.024</td>
<td>0.581</td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td>12</td>
<td>0.096</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>1</td>
<td>0.099</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI breastfeeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>25</td>
<td>0.09</td>
<td>0.020</td>
<td>0.536</td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td>4</td>
<td>0.10</td>
<td>0.007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>1</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>upper arm circumference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>10</td>
<td>0.08</td>
<td>0.031</td>
<td>0.423</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>20</td>
<td>0.09</td>
<td>0.007</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. The average breastfeeding DHA level based on nutritional status of breastfeeding mothers

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>DHA levels in Breast Milk</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI before pregnancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>17</td>
<td>0.073</td>
<td>0.007</td>
<td>0.456</td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td>12</td>
<td>0.076</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>1</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI breastfeeding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>25</td>
<td>0.073</td>
<td>0.006</td>
<td>0.304</td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td>4</td>
<td>0.079</td>
<td>0.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>1</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>upper arm circumference</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased</td>
<td>10</td>
<td>0.076</td>
<td>0.006</td>
<td>0.165</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>20</td>
<td>0.073</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall Discussion

The levels of essential fatty acids (AA and DHA) of breastfeeding mothers differ in each mother in a population in different parts of the world. This is influenced by the mother’s diet during breastfeeding or other factors. The mean value of AA levels in breast milk was 0.092 mg / ml and DHA levels were 0.072 mg / ml of breast milk. This is in contrast to breast milk protein levels in many countries, one of which was research in Iran with an average AA level of 0.16 mg / ml of breast milk and DHA levels of 0.08 mg / ml of breast milk.

The levels of the essential fatty acids of breast milk (AA and DHA) in breast milk in this study associated with body mass index (IMT) at breastfeeding showed no significant association in both conditions. This result is different from the results of research conducted by Chang and Yang have found a positive relationship between the composition of breast milk and breastfeeding mother’s BMI. These results are in line with the results of studies conducted by Quinn and other studies.
supporting this result suggest that maternal weight gain results in increased volume but not with breast milk composition ie fat, protein and energy\textsuperscript{22}.

**Conclusion**

Based on the results of research conducted, it can be concluded that:

1. Mean of essential fatty acid (AA) level in breast milk from breast feeding mother of LBW tends to be higher compared to normal birth weight baby with p = 0.052 (p> 0.05). Statistically, however, there was no relationship between infant birth weight and essential fatty acid (AA) levels in breast milk from nursing mothers aged 1-4 months in Makassar.

2. Mean levels of essential fatty acid (DHA) in breast milk from breast-feeding mothers of LBW tends to be higher compared with normal birth weight infants with p = 0.170 (p> 0.05). Statistically, however, there was no relationship between infant birth weight and essential fatty acid level (DHA) in breast milk from nursing mothers aged 1-4 months in Makassar.

**Acknowledgment:** The author would like to acknowledge the participants from Patingalloang Puskesmas, Puskesmas Layang and Tamangapa Health Center as well as Faculty of Public Health, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


16. Innis SM. Human milk: maternal dietary lipids and


Relationship between Early Breastfeeding Initiation and Involution Uteri of Childbirth Mothers in Nenemallomo Regional Public Hospital and Arifin Nu’mang Public Regional Hospital of SidenrengRappang Regency in 2014

Nurjanna¹, Suryani As’ad¹, Irfan Idris¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245, Sulawesi Selatan, Indonesia

Abstract

Early Initiation of Breastfeeding (EIBF) and exclusive breastfeeding are two of the factors to accelerate involution uteri. The aim of the research was to find out the relationship between early breastfeeding initiation and involution uteri of postpartum mothers. Independent variables were early breastfeeding initiation and independent sub-variables were age, education, and continuous breastfeeding (exclusive breastfeeding) until day 7, while dependent variables were involution uteri. The research was conducted in Nenemallomo Regional Public Hospital and Arifin Nu’mang Public Regional Hospital of Sidenreng Rappang Regency from October to December 2014. The subjects were primiparous mothers (giving birth first time normally). The data were analyzed statistically with Mann Whitney U, while independent sub-variables were analyzed using Chi square. The results of the research indicated that the variable of mother’s age and education have a relationship with involution uteri, while continuous breastfeeding variable (exclusive breastfeeding) until day 7 has a relationship with involution uteri. There is also a relationship between early breastfeeding initiations with the size of uterus in woman postpartum in day 7. Moreover, there exists a correlation between early breastfeeding initiation and lochia discharge of postpartum mothers in day 7. There is a significant correlation between early breastfeeding initiation and involution uteri of postpartum mothers.

Keywords: Childbirth; early breastfeeding initiation; involution uteri; postpartum.

Introduction

One of the causes of high maternal mortality rate (MMR) in Indonesia is due to postpartum hemorrhage caused by the occurrence of sub-involution of the uterus. EIBF and exclusive breastfeeding are two of the factors that can accelerate uterine involution. Breastfeeding is when the baby sucks the smooth muscles of the nipple, then the nerve is passed to the brain, then the brain instructs the hypophysis gland to release oxytocin so that the breast muscles emit breast milk. Besides, the hormone oxytocin also stimulates the smooth muscles of the uterus to contract better. Thus, the involution of the uterus is faster and lochia expenditure is smoother¹.

Research conducted by Palupi², showed that out of 20 respondents who had EIBF, 17 (85%) respondents experienced changes in uterine involution as seen from the normal majority fundal height and lochia and also found that respondents who carried out EIBF had a decreased in the fundal height and evenly distributed lochia abnormality is encountered at over 30 years of age and had given birth more than once.

With reference to Agusvina³ research, indicated that mothers who provided exclusive breastfeeding for up to 7 days have the opportunity to get normal process of fundal height is 29.8 times higher than those who do not exclusively breastfeed. Research on EIBF was also carried out by Handayani et al⁴. suggested that there was a significant difference in mean height of fundus uteri of 2 hours, 12 hours and 7 days after EIBF is done.

The Indonesian Government supports the WHO and UNICEF policies that recommended early breastfeeding initiation as an act of “Rescue of Life” because EIBF
can save (22%) of babies who die before the age of one month.

Touch, skin / emotion and baby lick on the mother’s nipple will stimulate the release of the hormone oxytocin, causing the uterus to contract and help remove the placenta and reduce the occurrence of postpartum hemorrhage. EIBF is an important starting point for the process of breastfeeding and to help speed up the return of the uterus to its original shape and reduce bleeding after birth. This is due to baby suction on the breast stimulating the pituitary gland in the brain to release oxytocin. The speed of uterine involution is influenced by several factors including maternal age, number of children born (parity), early mobilization and early breastfeeding. Oxytocin in addition to working to contract the milk channel in the milk glands also stimulates the uterus to contract so as to accelerate the process of involuntary uterus, on this basis, EIBF is carried out in order to speed up the course of involuntary uterus which ultimately reduces maternal mortality due to postpartum bleeding.

The exclusive coverage of breast milk in SidenrengRappang Regency in 2013 showed that out of 1056 babies, 897 babies (84%) received exclusive breastmilk. The purpose of this study was to determine the relationship of early breastfeeding initiation with uteri involution among postpartum mothers in Nenemallomo Regional Hospital and ArifinNu’ mang District Hospital in SidenrengRappang District.

Methodology

Research design

The research design used in this study was a longitudinal study with a prospective cohort. This study compared changes in research subjects after a certain period of time, prospective research to monitor the characteristics for a certain period of time, where the event was recorded when it happened.

Population and sample

The population in this study was all postpartum mothers who gave birth for the first time and had vaginal birth at RSUD Nene Mallomo and RSUD ArifinNu’ mang SidenrengRappang District between October to December of 2014. Samples were part of the number and characteristics possessed by the population. The sample selection of a study is adjusted to the type of research and research objectives. The sampling technique used in this study was non-probability sampling with a total of 30 samples.

Data collection

The research instrument is a tool used to measure research variables specifically so that the data needed in the research is produced. In quantitative research, instruments that can be used are interview guidelines and observation guidelines. In this study, data collection instruments used was questionnaires, observation sheets and checklists.

Data analysis

The test used in this data analysis is the Mann Whitney U Test and Chi square test, followed by univariate and bivariate statistical analysis.

Results

Univariate analysis

In Table 1, most of the distribution of maternal age was low risk (age 20 - 35 years) as many as 17 people (56.7%) and high risk distribution (age <20 or > 35 years) as many as 13 people (43.3%). The educational characteristics of the mothers revealed that 22 (73.3%) of them were highly educated while those with low education were 8 respondents (26.7%). In terms of feeding breastmilk to their newborn, 16 respondents (53.3%) fed their baby breastmilk (without other intakes) until the 7th day. Nonetheless, as many as 14 respondents (46.7%) did not give only breast milk (there was other intake) to the baby until day 7. In the administration of colostrum, majority of them gave colostrum to their babies, namely 25 respondents (83.33%) and only 5 respondents (16.66%) who did not give colostrum to their babies. For the EIBF category, there were 15 respondents (50%) who started EIBF fast (≥1 hours) while 15 respondents (50%) started EIBF slow (≥2 hours).
### Table 1. Distribution of maternal characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk (20-35 years)</td>
<td>17</td>
<td>56.7</td>
</tr>
<tr>
<td>High risk ( &lt;20 years or &gt; 35 years)</td>
<td>13</td>
<td>43.3</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (high school – college/university)</td>
<td>22</td>
<td>73.3</td>
</tr>
<tr>
<td>Low (elementary- junior high school)</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>Breastmilk feeding (till the 7th day)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only breastmilk</td>
<td>16</td>
<td>53.3</td>
</tr>
<tr>
<td>Breastmilk + other intake</td>
<td>14</td>
<td>46.7</td>
</tr>
<tr>
<td><strong>Colostrum feeding</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25</td>
<td>83.33</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>16.66</td>
</tr>
<tr>
<td><strong>Early initiation of breastfeeding (EIBF)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast (≥ 1 hour or &lt; 2 hours)</td>
<td>15</td>
<td>50</td>
</tr>
<tr>
<td>Slow (≥ 2 hours or &lt; 3 hours)</td>
<td>15</td>
<td>50</td>
</tr>
</tbody>
</table>

### Bivariate analysis

Based on Table 2, it can be seen that the value of $\rho = 0.083 (< 0.05)$, thence $H_a$ is rejected and $H_o$ is accepted indicating there is a relationship between age factors and uterine involution. The relationship of education variables which are sub-variables with uteri involution showed that the value of $\rho = 0.421(> 0.05)$ which on the other hand signified that $H_o$ is accepted and it can be concluded that there is no relationship between variables of education with involution of the uterus.

Table 3 presented the results of the analysis of the relationship between variables of breastfeeding (sub-variable) with uteri involution which showed that the value of $\rho = 0.00 (<0.05)$. Therefore, $H_o$ was rejected and $H_a$ was accepted, implying that there was a relationship between breastfeeding and involution of uteri.

With reference to the results of the analysis of the relationship between EIBF and uterine size as tabulated in Table 4, it was found that the value of $\rho = 0.00 (<0.05)$. Thus with that, $H_o$ was accepted and this signified there was a relationship between EIBF and Fundus Uteri Height among mothers on the 7th day of postpartum.

Based on Table 5, it can be explained that the results of the analysis of the relationship of EIBF with lochia discharge showed there was a significant relationship between early initiation of breastfeeding and lochia discharge since the value of $\rho = 0.00 (<0.05)$. $H_o$ was rejected whereas $H_a$ was accepted.
Table 2. Relationship between age and education with uterine involution among postpartum mothers on day 7

<table>
<thead>
<tr>
<th>Factors</th>
<th>Uteri involution</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fast (N)</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk (20-35 years)</td>
<td>11</td>
<td>84.61</td>
</tr>
<tr>
<td>High risk (&lt;20 years or &gt; 35 years)</td>
<td>2</td>
<td>15.38</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>11</td>
<td>84.61</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>15.38</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3. Relationship between continuous breastfeeding / breast milk only until day 7 with 7th day postpartum uterine involution

<table>
<thead>
<tr>
<th>Breastfeeding</th>
<th>Uteri involution</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fast (N)</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>100</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4. Relationship between early initiations of breastfeeding (EIBF) with uterine involution seen from fundal height among postpartum mothers on day 7

<table>
<thead>
<tr>
<th>Uteri involution N</th>
<th>Fast (EIBF)</th>
<th>Slow (EIBF)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Palpation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ half centre symphysis</td>
<td>14</td>
<td>93.3</td>
<td>0</td>
</tr>
<tr>
<td>&gt; half centre symphysis</td>
<td>1</td>
<td>6.66</td>
<td>15</td>
</tr>
<tr>
<td>Fundal height (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 11 cm</td>
<td>14</td>
<td>93.3</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 11 cm</td>
<td>1</td>
<td>6.66</td>
<td>15</td>
</tr>
</tbody>
</table>

Table 5. Relationship between EIBF with lochia discharge among mothers on postpartum day 7

<table>
<thead>
<tr>
<th>Lochia discharge</th>
<th>Fast (EIBF)</th>
<th>Slow (EIBF)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Normal</td>
<td>14</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>Abnormal</td>
<td>1</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
<td>15</td>
</tr>
</tbody>
</table>
Discussion

Among mothers who are older, many are affected by the aging process, where the aging process increased the amount of fat, decreased muscle elasticity and decreased absorption of fat, protein, and carbohydrates. If this process is associated with a decrease in protein in the aging process, then this will consequently inhibit uterine involution. Among relatively young age mothers, whereby the individual reaches a state of prime vitality so that muscle contraction and uterine involution are also faster due to the regeneration of the cells because

The results of research conducted by Agusvina showed that there was no difference in the proportion of uterine fundus height between mothers aged 20-30 years with mothers aged 31-35 years meanwhile the study carried out by Palupi, stated that respondents who were EIBF found there were changes in fundal height and abnormal discharge of lochia, which were found on average over women age 30 years and had given birth more than once. Heriati also agreed that age is very closely related to a decrease in uterine fundal height. The older a person is, the less reproductive function is found on average over 35 years of age and has given birth more than once.

The results of research obtained from the Chi square test showed that the value of $\rho = 0.421 (> 0.05)$, thus $H_0$ is accepted meaning there is no relationship between mothers’ education level with uteri involution. This statement was supported by Agusvina, who found out that education has no direct effect on uterine involution because there are many other variables that influence it. Education is often related to socioeconomic status. A person with low education usually has a low socioeconomic status and will affect the income and purchasing power of daily needs such as staple foods which will impact the nutritional status. The more education a person gets, her maturity increases and eventually they will easily accept and understand positive information related to health problems. In other words, women who have higher education tend to pay more attention to their health.

Chi square analysis of the relationship of continuous breastfeeding alone for 7 days showed that the value of $\rho = 0.00$, thence there is a relationship between continuous breastfeeding alone during 7 days with uterine involution. Suctioning of the nipple by the baby during the EIBF process stimulates the sensory nerve endings on the nipple which will cause an action potential which then spreads to the spinal cord and then to the hypothalamus. One way to maintain good contractions d until the end of childbirth is by performing exclusive breastfeeding. Because by breastfeeding, the muscles in the uterine area will experience contractions and retractions which in the presence of this contraction will cause the blood vessels in the uterus to stretch so that bleeding can be avoided.

The process of involution is accelerated in mothers who breastfeed their babies because oxytocin is released in response to baby suction, early breastfeeding will cause touch, emulation and licking of the baby in the mother’s nipples during the suckling process will stimulate oxytocin release which causes the uterus to contract so as to help reduce bleeding. Oxytocin is a powerful simultaneous for uterine muscles.

According to Nissenet al. It was found that oxytocin levels in the maternal peripheral circulation were much lower during labor than during breastfeeding. In women who fully breastfed their babies, oxytocin levels turned out to increase from 4.6 µU / ml at the second and fourth weeks of postpartum to 8.6 µU / ml at 15 and 24 weeks.

Agusvina showed that postpartum mothers who had breastfeeding frequency were more than13 times per day as many as 10 people (33.3%) with an average fundal height decrement of 3.08 cm. 8 mothers (26.7%) that were breastfeeding between 10-12 times per day had an average of 4.03 cm decreased in fundal height. Those mothers with frequency of breastfeeding less than 10 times per day as many as 12 people (40%) had an average fundal height decreased by 5.22 cm only. This results proved that there is a significant effect between the frequency of breastfeeding and a decrease in fundal height ($p$-value = 0.000).The conclusion of the study emphasized that mothers who exclusively breastfed had the opportunity to obtain normal fundal height 3.973 times faster compared to mothers who do not breastfeed exclusively.

The results of the analysis of the relationship between EIBF and uterine involution seen from fundal height showed that the value of $\rho = 0.000$, thus it is proven that there is a relationship between early breastfeeding initiation and fundal uteri height among mothers of postpartum day 7.Fundal uteri height in postpartum
mothers on day 7 was based on palpation by determining the location and height of the uterus, namely mid-center and upper edge of pubic symphysis with uterine weight of 500g with a diameter of 7.5 cm.

In the research conducted by Agusvina\(^3\), the results of the study stated that there was a difference in the proportion of uterine fundal size between mothers who were EIBF and mothers who did not do EIBF (there was a significant relationship) between EIBF and size of fundal uteri height. This was supported by Handayaniet al\(^4\) research which found that there were significant differences in fundal height averaging from 2 hours, 12 hours and 7 days after EIBF was performed with those who did not EIBF. Hence, it was known that EIBF had an influence on uterine involution.

The results of the analysis of the relationship of early breastfeeding initiation with lochia discharge showed that the value of \(\rho = 0.00\), which concluded that there is a significant relationship between early breastfeeding initiation and lochia discharge. The relationship between EIBF and uterine involution is measured from two indicators, namely uterine size (USG) and lochia discharge (observation). The results of the analysis of the relationship between EIBF and uterine involution seen from the size of the uterus showed that the value of \(\rho = 0.00\) which deduced that there is a relationship between EIBF and uterine size, while the results of breastfeeding initiation relationship analysis with lochia discharge shows that the value of \(\rho = 0.000\). Early breastfeeding initiation and lochia discharge had a significant relationship.

Ambarwati et al\(^1\) studied the relationship of early breastfeeding initiation to the high decrease in fundus of postpartum maternal uterus at Sidorejo Health Center, Lotaota Salatiga. Out of 20 respondents, the number of respondents given EIBF with primiparous parity and changes in involution seen from fundal height and lochia, majority of the normal were 17 people (85%). Based on the results of the study, respondents who had EIBF with primiparous parity were found to have changes in fundal height and normal lochia discharge with a \(p\) value of 0.003. According to Hasinuddin\(^1\), the results of statistical tests with t-test of 2 free samples showed that the significance level was smaller than \(\alpha\) (0.000 <0.05), thus it could be concluded that there was an effect of early breastfeeding initiation on uterine involution in primiparous postpartum mothers.

### Conclusion and Recommendation

Conclusions from the results of the study showed that there was a significant relationship between early breastfeeding initiation (EIBF) and uterine involution among postpartum mothers. It is hoped that this research can be a reference for further researchers and measurement of uterine involution can be done using a more sophisticated ultrasound device (3D or 4D).

### Acknowledgement

The authors would like to thank Faculty of Medicine, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

### Ethical Clearance

Taken from the committee

### Source of Funding

Nil

### Conflict of Interest

Nil

### References

6. Bahiyatun SP. Normal midwifery care textbook. EGC.
7. Aryani F. Behavior description in the implementation
8. Heriati D. Factors that influence the knowledge of the use of post placental IUD in the hospital Zainoel Abidin Year. 2013.


10. Sukarsih S, Susilowati E. Effect of Early Breastfeeding Initiation on maternal uterine contractions at Bluto sub-district BPS. WIRARAJA MEDIKA. 2013 May 1;3(1).


The Pay Ability and Willingness to Pay for Treatment at Pangkajene Hospitals

Nurul Fajriah Istiqamah¹, Darmawansyah¹, Amran Razak¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

Determination of tariffs in health services is very instrumental in influencing demand from low and high income groups. The aim of the study was to find out the level of ability and willingness to pay general patients hospitalization in the Pangkep District Hospital. This research is a quantitative research with descriptive method with a sample of 87 people taken by means of quota sampling technique and analyzed using univariate analysis. The results showed that 38 respondents (43.7%) agreed that the highest ability to pay based on willingness to pay ATP 1 was <Rp. 15,000,000 while 2 respondents (2.3%) settled for the minimum rate of ≥ Rp. 60,000,000. While ATP 2 showed that the ability to pay based on expenditure for the largest non-food was Rp.100,000-Rp.500,000 as supported by 68 respondents (78.2%) are in class III and the smallest Rp.1,000,001-Rp.1,500,000 were 4 respondents (4.6%) were in the VIP class, the largest non-essential expenditure <Rp.150,000 as many as 36 respondents (41.4%) were in class III while the lowest was Rp.3,500,000-Rp.4,500,000 as much as 2 respondents (2.3%) were in the VIP class. 57 respondents (65.5%) said that the hospital rate is non-reasonable whereas and as many as 30 respondents (34.5%) said it were affordable rates. The conclusion of this study showed that the ability and willingness to pay the community was in accordance with their respective classes.

Keywords: Ability and willingness; bills; health care; hospitals; inpatient

Introduction

Based on the concept of national development, the Ministry of Health is responsible for implementing the ‘Indonesia Sehat’ program which aims to increase knowledge, willingness and ability to live healthily for everyone in a healthy living environment. The implementation of the ‘Indonesia Sehat’ program requires a comprehensive regulatory framework and health development financing policy between government and health development sector¹.

Limited health financing coupled with the production costs of health services in hospitals continued to increase, which will affect the tariff of government hospitals. Current tariffs do not allow government hospitals to develop, while the need to develop is higher because of the competition between hospitals is growing³. Thabrany ³ stated that even though the tariff rates which are calculated on the basis of Ability to Pay (ATP) and Willingness to Pay (WTP) have been introduced previously, the problem of affordable tariffs is still not completed because of the nature of uncertain needs. Despite the number of patients who do not pay in government hospitals is relatively small, but that does not mean that the community is able to automatically reach the services provided. For instance, someone who has an income of Rp.2,000,000 per month if being hospitalized for 60 days, and maintenance costs per day is Rp.35,000, so 60x35,000 = Rp.2,100,000 not to mention the cost of medicine, doctor services, supporting examinations and others. If he does pay the total cost of the hospital, then the nature of the payment is considered as a forced payment.

Based on the results of previous studies, conducted by Juliasih et al²., it was found that the ability to pay by the inpatients in the VIP class for 3 days of hospitalization was categorized as high in the range of Rp. 700,000 to Rp. 1,200,000 because this service user usually has relatively

Corresponding author:
Nurul Fajriah Istiqamah
E-mail: nurulfajriahistiqamah@gmail.com

DOI Number: 10.5958/0976-5506.2019.00810.6
high income. Study done by Mudayana, found that the patient’s ability to pay for hospital services was an average of Rp. 100,033 per three-day hospitalization whereas the lowest cost was Rp. 9,333. This was due to the amount of income of respondents less than Rp.1,000,000 per month. Those with low incomes are usually educated up to high school only. Thus, they are not able to secure themselves a high paying income jobs.

Determination of tariffs in Kabupaten Pangkep District Hospital is not determined based on ability and willingness to pay by the patients, but because of the high operational costs in 2013. In 2014 until now, the tariff increase was caused by an increase in operating costs in the year.

Therefore, it is necessary to analyse the ability and willingness of patients or community users of health services to pay so that later they can find out the appropriate costs and finally as one of the references to policy makers regarding the determination of rates and guideline for budget planning in hospitals, especially in inpatient units.

Methodology

The type of research used is quantitative research with a descriptive survey to obtain an overview of the ATP and WTP of general patients hospitalized in the District General Hospital. The population in this study were all 1646 general patients who underwent inpatient care at Pangkep District Hospital. Samples in this study were general patients who were inpatient care. The number of samples obtained using quota sampling technique was 87 people. Data collection was obtained through interviews using questionnaires or data processing questionnaires performed computerized using SPSS. Data is presented in narrative form, frequency distribution tables accompanied by interpretations.

Results

The calculation of respondents’ ATP in this study was based on the ability of general patients to pay tariffs of inpatient installations at Pangkep District Hospital using ATP 1 formula and ATP 2 formula and these results are tabulated in Table 1. The results showed that VIP care classes had the largest ATP 1, ranging from Rp. -Rp.30,000,000 per year as many as 9 respondents (52.9%) while the lowest ATP 1 is around Rp. 30,000,001-Rp. 45,000,000 with only 1 respondent (5.9%). treatment for class 1 had the biggest ATP 1, which ranged from Rp. 15,000,000 to Rp. 30,000,000 per year as many as 7 respondents (36.8%) while the lowest ATP 1 ranged from Rp. 45,000,001 to Rp. 60,000,000 supported by 2 respondents (10.5%). Class II care had the largest ATP 1, which ranged from <Rp. 15,000,000 for 9 respondents (42.9%) while ATP 1 is the lowest, which was Rp. 45,000,001-Rp. 60,000,000, 1 respondent (4.8%). In class III treatment, it had the largest ATP 1, which was <Rp. 15,000,000 as many as 22 respondents (73.3%) while the lowest ATP 1 was Rp. 45,000,001-Rp. 60,000,000 with 1 respondent (3.3%).

Table 1. Respondent Distribution Based on Ability to Pay (ATP 1) For Each Treatment Class

<table>
<thead>
<tr>
<th>Treatment class</th>
<th>VIP</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 1 (Rp.)</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 15,000,000</td>
<td>2</td>
<td>11.8</td>
<td>5</td>
<td>26.3</td>
</tr>
<tr>
<td>15,000,000 – 30,000,000</td>
<td>9</td>
<td>52.9</td>
<td>7</td>
<td>36.8</td>
</tr>
<tr>
<td>30,000,001 – 45,000,000</td>
<td>1</td>
<td>5.9</td>
<td>5</td>
<td>26.3</td>
</tr>
<tr>
<td>45,000,001 – 60,000,000</td>
<td>3</td>
<td>17.6</td>
<td>2</td>
<td>10.5</td>
</tr>
<tr>
<td>≥60,000000</td>
<td>2</td>
<td>11.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
<td>19</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on non-food expenditure results (refer to Table 2) which is calculated using ATP 2 formula, showed that VIP care class had the biggest ATP 2, which ranged from Rp. 100,000 to Rp. 500,000 per year, which was 13 respondents (76.5%) while the lowest ATP 2 was around Rp.1,000,001-Rp.1,500,000 as many as 4 respondents (23.5%). The class I treatment had the biggest ATP 2, which ranged from Rp.100,000-
Rp.500,000 per year as many as 17 respondents (89.5%) while the lowest ATP 2 ranged from Rp.100,000 to 2 respondents (10.5%). In the class II care, it has the largest ATP 2, which ranged from Rp.1,000,001-Rp.1,500,000, as many as 18 respondents (85.5%), while ATP 2 is the lowest, which is <Rp.100,000, 3 respondents (14.3%). For class III treatment had the biggest ATP 2, which ranged from Rp.1,000.001-Rp.1,500,000 as many as 20 respondents (66.7%) while ATP 2 was the lowest, which was <Rp.100,000 as many as 10 respondents (33.3%).

The highest ATP by the responders are calculated using the ATP formula 2 based on non-essential expenditure which was <Rp.150,000 while the smallest is in the range of Rp.350.001-Rp.450,000. As shown in

Table 2. Respondent Distribution Based on Ability to Pay (ATP 2) For Each Treatment Class

<table>
<thead>
<tr>
<th>Treatment class</th>
<th>VIP</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 2 (Rp.)</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 100.000</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>10.5</td>
</tr>
<tr>
<td>100.000 – 500.000</td>
<td>13</td>
<td>76.5</td>
<td>17</td>
<td>89.5</td>
</tr>
<tr>
<td>1.000.001 – 1.500.000</td>
<td>4</td>
<td>23.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
<td>19</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3, the average ATP by the respondents were Rp. 211,724. The VIP care class had the largest ATP 2, which ranged from Rp. 2,500,001 to Rp. 3,500,000 per year as many as 12 respondents (70.5%) while the lowest ATP 2 was ranged from Rp.350.001 to Rp.450,000 as many as 2 respondents (11.8%). Based on Table 4, it is found that class I care had the largest ATP 2, which ranged from Rp.2,500,001-Rp.3,500,000 per year as many as 14 respondents (73.7%) while the lowest ATP 2 ranged from <Rp.150,000 for 5 respondents (26.3%). Class II treatment, had the largest ATP 2, which ranged between Rp.2,500,001 to Rp.3,500,000 per year as many as 16 respondents (76.2%) while the lowest ATP 2 ranged from <Rp.150,000 with 5 respondents (23.8%) In class III treatment, ATP 2 ranged from <150,000 as many as 26 respondents (86.7%) while the lowest ATP 2 was Rp.2,500,001-Rp.3,500,000 as many as 4 respondents (13.3%). In Table 5, the results of the study showed that out of 87 respondents there were 30 respondents (34.5%) who said the rates of care in the District Hospital. Pangkep has been affordable, while as many as 57 respondents (65.5%) said the rates of care in the District Hospital. Pangkep is not affordable.

Table 3. Respondent Distribution Based on Ability to Pay (ATP 2) For Non Essential Expenditure (per annum)

<table>
<thead>
<tr>
<th>ATP 2 Non Essential Expenditure-per annum (Rp)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 150.000</td>
<td>36</td>
<td>41.4</td>
</tr>
<tr>
<td>150.000 – 250.000</td>
<td>32</td>
<td>36.8</td>
</tr>
<tr>
<td>250.001 – 350.000</td>
<td>14</td>
<td>16.1</td>
</tr>
<tr>
<td>350.001 – 450.000</td>
<td>2</td>
<td>2.3</td>
</tr>
<tr>
<td>≥ 450.000</td>
<td>3</td>
<td>3.4</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4. Respondent Distribution Based on Ability to Pay (ATP 2) For Non Essential Expenditure (per annum) For Each Class Treatment

<table>
<thead>
<tr>
<th>Treatment class</th>
<th>VIP</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 2 Non Essential Expenditure-per annum (Rp)</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 150.000</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>26.3</td>
</tr>
<tr>
<td>150.000 – 350.000</td>
<td>12</td>
<td>70.5</td>
<td>14</td>
<td>73.7</td>
</tr>
<tr>
<td>350.001 – 450.000</td>
<td>2</td>
<td>11.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>≥ 450.000</td>
<td>3</td>
<td>17.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>100</td>
<td>19</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5. Respondent Distributions Based on Tariff Affordability

<table>
<thead>
<tr>
<th>Treatment class</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>VIP</td>
<td>9</td>
<td>10.3</td>
<td>8</td>
</tr>
<tr>
<td>Class I</td>
<td>9</td>
<td>10.3</td>
<td>10</td>
</tr>
<tr>
<td>Class II</td>
<td>2</td>
<td>2.3</td>
<td>19</td>
</tr>
<tr>
<td>Class III</td>
<td>10</td>
<td>11.5</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>34.5</td>
<td>57</td>
</tr>
</tbody>
</table>

Discussion

ATP and WTP are two factors that play a role in the utilization of medical services, which in turn will affect equity. The calculation of household expenditure is considered to be a quite sensitive method for Indonesia’s economic conditions\(^6\). ATP for health is the actual funds that can be allocated by someone to pay for health\(^7\). In this study, ATP was calculated using 2 approaches, ATP I is calculated based on Equation 1 whereas ATP is calculated using Equation 2.

\[
\text{ATP1} = \frac{\text{Total income} - \text{Total expenditure}}{\text{number of dependents}}
\]

Eq. 1

\[
\text{ATP2} = 5\% \times \text{Total non - food expenditure} \times 5\% \times \text{Total non - food expenditure}
\]

Eq. 2

High income is directly proportional to the higher expectations of getting services that are in line with the costs incurred to obtain this services\(^8\). The results of this study are in line with research conducted by Mudayana\(^4\) which stated that family income affected the patients’ ATP for health services that have been provided. Furthermore if the patient’s income is still lacking, then they assumed that they cannot afford health services.

Besides income factors, the number of families also affects the ability of respondents. Alam et al\(^9\) justified that the number of family members or the number of family dependents, have a positive and significant effect on the amount of household consumption that affects the ability to pay patients. Educational factor indirectly contribute to influence the socio-economic conditions of the family. Thus, this will also affect families in the utilization of health services. Someone who has a higher education will have a better thought in processing information so that it can influence his knowledge in a matter, including in the utilization of health services\(^10\). However, this is not proven
in the research done by Sutrusmi because of the results indicated that there was no correlation between knowledge and willingness to pay for general patients in class III of Pekalongan City Hospital.

The expenditure for meals in this study consisted of respondents’ expenditure in one year in the form groceries and other consumption which were calculated in units of rupiah. The income level of most respondents is high and also the majority of respondents have as many as 5-7 family members which results in a high amount of food expenditure. This study also showed that the type of food expenditure is the highest type of expenditure compared to other expenses. This is very reasonable because the expenditure on food is a basic need that must be fulfilled for human survival.

Non-food expenditure in this study consisted of respondents’ expenditure for one year in the form of expenditure for utilities, clothing, durable materials, taxes, and education. The majority of respondents spend high food costs so that the costs incurred for non-eating purposes are quite low when compared to the costs for food and non-food expenses such as land and building tax payments paid jointly.

In this study the most non-food expenditure issued by respondents is expenditure for utilities. Household needs are daily necessities, while the least non-food expenditure issued by respondents is expenditure to buy durable goods such as kitchenware, jewellery and vehicles because the purchase of durable goods can be done in long term. This is in line with the research conducted by Wuryandari who concluded that the higher the proportion of money spent on food, the lower the household’s purchasing power for other needs. In this study non-essential expenditures consist of expenses for necessities parties and ceremonies, expenditures on cigarettes, alcohol and snacks, expenses for entertainment, recreation and others. On the other hand, the least non-essential expenditure of respondents is for parties and ceremonies, because these occasions are rarely done or/and usually done only once a year. The results of this study is analogous with Situmeang et al’s theory which stated that if a person is able to spend on non-essential goods, then of course the person also would be able to incur costs for essential health services. Handayani et al concluded that the amount of food expenditure is inversely proportional to expenditure for other needs or higher.

WTP of the respondents is high in this variable because the majority of respondents rated the services they received during treatment in the District Hospital. Pangkep is good.

WTP for high health services is usually driven by one’s perception in choosing a class of care based on good quality service. Hence, the hospital needs to pay attention to their wishes and complaints. Moreover, to increase the willingness to pay for the patients, the hospital needs to increase public perception that services in inpatient installations, especially in the VIP class and class I are the best treatment rooms and they will get satisfying services so that the sacrifice of patients in the form of paying tariffs will suit what they receive.

**Conclusion & Recommendations**

Based on the results of the study, it is known that the ability to pay of the inpatients in Pangkep District Hospital is in accordance with the class of care they want. While the willingness to pay for inpatient of Pangkep District General Hospital is high because of the good quality of service. Thus, the hospitals need to provide complete information about the rates before admitting the patients.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

4. Mudayana AA. Ability and Will Analysis of Paying Inpatients in PKU Muhammadiyah Hospital Bantul.
Kes Mas: Journal of the Faculty of Public Health. 2015 Sep 17;9(1).


11. SUTRUSMI S. Analysis of ability and willingness to pay and factors related to willingness to pay for Class III General Patients in Pekalongan City Hospital (Doctoral dissertation, Diponegoro University).


Analysis of KarebaBaji Community Role as Peer Educators in Healing Effect of Multi Drug Resistance Tuberculosis at RSUD LabuangBaji Makassar City

Rachmawati1, Muh. Syafar1, Ida Leida1

1Faculty of Public Health, Hasanuddin University, Jl. PerintisKemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study to analyze role of KarebaBaji community as peer educator in healing effort of tuberculosis (TB) multi drug resistance (MDR) in LabuangBaji Hospital at Makassar City. This study had used qualitative research design with case study approach. This design was used to analyze KarebaBaji community role as peer educator in effort in healing of MDR TB patients. This study was used 3 data collection techniques that were in-depth interview, focus group discussion (FGD) and observation. The informant determination method used in this study was purposive sampling method. The informants were 10 peer educators, 3 MDR tuberculosis (TB) patients, 2 health workers, and 1 expert informant. The study was planned in early March until mid-April 2016. Peer educator understood meaning, transmission, diagnosis, temporary/previous treatment, transmission prevention and MDR TB side effects based on experiences, information from health workers, and training. The motivation in peer educators as sharing experiences, support people for complete the treatment, became friends and help the patient and reduce and transmission prevention. The peer educator skills in mentoring MDR TB patients used persuasive methods. The communication was done through verbally and non-verbally such as support in term of information, treatment discipline and side effect, and emotional support by listens their complaint and self-esteem support in form of motivation, spirit and confidence.

Keywords: KarebaBaji; MDR TB; Peer educator

Introduction

Tuberculosis (TB) is still one of health problem faced on most of countries although control directly observed treatment (DOTs) strategy had been implemented in many countries since 1995. World Health Organization (WHO) had reported estimation 450,000 people suffered Multi Drug Resistance (MDR) TB and 170, 000 people were died. There were 6800 new MDR TB cases had recorded in Indonesia each year and 2% from new cases with 12% from TB treatment were MDR TB cases. Besides, estimated more than 55% of patients with MDR TB had not been diagnosed or not received proper and correct treatment. Meanwhile, 300 000 MDR TB cases were resistance in the drug and half of case from India, China and Russia. There were 1.6 million MDR TB patients worldwide from year 2006 until 2015 where 60% of these patients were from countries with high TB MDR cases.

The resistance of mycobacterial tuberculosis to anti tuberculosis drug is a condition where bacteria were not killed by drug such as Isonicotinic Acid Hydrazide (INH) and Rifamfizin or together with other first-line anti-TB drugs such as ethambutol, streptomycin and pyrazinamide. The resistance drug is “human made phenomenon resulted from insufficient treatment of TB patients or trasmission from TB drug resistance patients”. There were 100% of MDR TB patients experienced side effects, 20% of patients had family members suffered TB diseases, and 60% of patients faced difficulty in treatment. The delay in diagnosis due to lack of knowledge in community about TB had increased transmission risk. The TB patients with previous treatment had experienced greater anti tuberculosis drug resistance (96.2%) than those who recovered tuberculosis (23.1%) and about 40 times anti tuberculosis drug resistance more than those with sufficient treatment. The MDR TB monitoring treatment was not optimal.
due to in cooperative among patients in treatment, health program and health service facilities. The main obstacles in handled MDR TB cases in RSUD LabuangBaji were influenced by medication compliance and accessibility aspects, treatment side effects, economic problems; especially transportation costs.

The peer educator concept is provided motivation and education by patient to patient. The support and information from peers more effective in provided psycho social support to patients in order to be healthier. The peer educator selection method versus other methods such lecture or counseling methods was based on the peer educator concept that accepted by the target.

The MDR TB treatment is more complicated than first-line TB treatment. The main support and information were needed by the patient especially support from former patients in share their experience. Besides, the stigma and discrimination from environment and community had affected the MDR TB recovery. Based on this background, the authors were interested to conduct the study on the role of KarebaBaji community as peer educator in healing effort of MDR TB in LabuangBaji Hospital at Makassar City.

**Methodology**

This study had used qualitative research design with case study approach. This design was used to analyze KarebaBaji community role as peer educator in effort in healing of tuberculosis (TB) multi drug resistance (MDR) patients. This study was conducted in Poly MDR TB RSU LabuangBajiin Makassar city. The study implementation was planned in early March until mid April 2016. The informants were 10 peer educators, 3 tuberculosis (TB) MDR patients, 2 health workers, and 1 expert informant. The informant determination method used in this study was purposive sampling method. This study was used 3 data collection techniques that were in-depth interview, focus group discussion (FGD) and observation.

The questions included in first part are Peer educator knowledge on MDR TB, MDR TB symptoms, MDR TB transmission, MDR TB diagnosis, MDR TB temporary/previous treatment, MDR TB disease transmission prevention and the MDR TB side effects. The second part are about the motivation to be peer educator, Peer educator benefit, Reward received after became peer educators, Risk of transmission again (relaps), Methods in peer educator activities and Training as peer educator. The last part are about the way on Given information, education and motivation, The relationships with health workers and related agencies in government and non-government, The experience as peer educator, The communication way with MDR TB patient, Peer educator effort made communication more effective, Communication barriers, Support toward TB MDR patient and Peer educator support from the environment.

**Result and Discussion**

From in-depth interview with KarebaBaji informants, most of informant understanding about MDR TB was good but still not explained accurately about MDR TB. The peer educators generally understood about MDR TB from experiences as patient and during peer educator training. There were three things in healthy lifestyle such as right knowledge, motivation, and skill. The knowledge also important affected person’s behavior. The former patients or current TB patients provided more knowledge than person that never experienced this disease. The patient had undergone treatment was did good prevention efforts, especially cough prevention and treatment ethic. The knowledge in treatment was important in the treatment successful since patient had experienced long term treatment. Besides, patients that did not knew TB treatment process was among factor in drop out in TB treatment. The lack in socioeconomic condition was factor that the patient did not continuous treatment. The health worker informants were important since their role in given support, motivation and increased patient’s self-esteem.

The study showed KarebaBaji peer educator motivation had reduced MDR TB incidence, prevent transmission, given information, motivated patient for treatment, shared experiences, and supported the patients. The motivation was psychological concept in form of behavior, feeling and word for achieved goal. The peer educators shared their experiences with TB MDR patients. The competence factor influenced persuasive communication successful were motivation, knowledge and skill. The impact has occurred was patient experienced drop out treatment and led to occurrence MDR TB cases. In additions, environment factors were important motivation to support individuals that led behavioral changes. Besides, same language in communication had more intimate relationship and interaction that helped in behavior changed.
In this study, benefits became as peer educator were social activities, made new friends, increased experiences, more confidence, increased knowledge and information sources. The unhygienic environment led to mycobacterium tuberculosis bacteria transmission. The effort in transmission prevention included natural ventilation, mechanical ventilation and ultraviolet light\textsuperscript{21}.

The peer educator method used in this study were good listener without judging, talk from heart to heart, counseling, shared experienced, given motivation and showed pictures. Besides, peer educator also provided their assistance related to knowledge and skill about MDR TB disease. The training is needed for peer educator that never experienced in MDR TB disease\textsuperscript{11}. Based on assumption, peer educator efforts on provided health care to individuals, families and communities. The informant provided motivation based on knowledge gained during training and experience when MDR TB treatment. The peer educator had understood basic skills in helping values. The understanding in self and others need and learned lesson occur in social environment\textsuperscript{22}. The peer groups had influenced each member in behavior for mutual respect, help and responsible\textsuperscript{23}. The role in healing of TB patient was important in treatment effectiveness\textsuperscript{24}.

The communication process is delivery of messages (encode) from communicator through certain channel to beneficiary party caused certain effects. The communication was important in peer educator role in persuaded MDR TB patients to complete treatment. MDR TB patients were often sensitive to their feeling during treatment due drug side effects or discrimination from community. The patients are given chance for spoke out and complaint about problem encountered during MDR TB treatment. The two-way communication with patients needed skill in deal with patient’s complaint\textsuperscript{24}. The ability in communication provided productive input, mutual trust, accepted and appreciated\textsuperscript{25}. The purpose in communication effective was produced desired changes from message recipient. Besides, good environment was required so that patients received all information from health workers\textsuperscript{27}. In additions, communicator had credibility, and good experience and knowledge factor was associated with trust\textsuperscript{28}. The communication barrier was social status that led MDR TB patients embarrassed and hides status in their environment\textsuperscript{29}.

The social support was aid individual received from group around patients by led recipient felt comfortable, love and appreciated. The information and motivation were important to support MDR TB patients in undergone treatment so that not transmitted toward family and environment. The study is obtained peer educator’s support to MDR TB patients were motivational support for recovery, enthusiasm and confidence in treatment, be listener for patient’s complaint and information support in treatment. The motivation support for recovery, spirit and confidence in treatment included self-esteem support. The peer educator support had transformed patient in a positive way\textsuperscript{30}. Besides, patient complained lost job because of long term treatment. There was significant relationship between social support and life quality for tuberculosis patient in Manado\textsuperscript{31}. The self-esteem support such as motivation and spirit from family and health workers was important for MDR TB patients in completed treatment. The support was increased to peer support groups from patient itself, families, partners and public for information\textsuperscript{32}.

**Conclusion**

In conclusions, peer educator understood meaning, transmission, diagnosis, temporary/previous treatment, transmission prevention and MDR TB side effects based on experiences, information from health workers, and training. The motivation in peer educators as sharing experiences, support people for complete the treatment, became friends and help the patient and reduce and transmission prevention. The peer educator skills in mentoring MDR TB patients used persuasive methods. The communication was done through verbally and non-verbally such as support in term of information, treatment discipline and side effect, and emotional support by listened their complaint and self-esteem support in form of motivation, spirit and confidence.

**Acknowledgment:** The author would like to extend the appreciation to all the participants from LabuangBaji Hospital as well as Faculty of Public Health, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil
References


15. Tirtana BT,Musrichan. Factors that influencing the success of treatment of certain cases of tuberculosis with resistance to tuberculosis in the Central Java region. Medicine at Diponegoro Faculty University. 2011


18. Wati RR. Relationship between Nurses’ Role As an educator with the treatment of cured pulmonary tuberculosis patients in the Inpatient Room of the New Hospital in Jember Regency. 2015.


22. Diantina FP. The design of the peer educator module to foster helping values for the facilitator in the peer education prevention program in reducing the intensity of the cigarette smoke (study in the Bandung Wetan area). Proceedings of SnaPP:


27. Indiyanti DD. The nurse’s communication with the level of satisfaction regarding health care for pulmonary tuberculosis patients at the Sukodono-Surakarta Public Health Center. Medica Magapahit. 2012;4(1).

28. Hayati MN, Devy SR.


30. Utari S. Personal communication between parents in transferring knowledge to Toraja in Makassar City. Faculty of Social Sciences and Politics at Hasanuddin University. 2015.


Yellow Passion Fruit Peels (Passiflora edulis F. Flavicarpa Deg.)
Juice effect on the Defecation Pattern of the Patients with Diabetic Mellitus Type 2 in Pinrang Regency

Rahma1, Citrakesumasari1, Stang1
1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

This research aimed to analyze and assess the acceptability of the juice of yellow passion fruit peels defecation pattern of the patients with DM type 2 in the work areas of Teppo and Salo Health Centers, Pinrang Regency. The research type was a quasi-experiment with the design of non-randomized pre test and post test with control group. The samples were then divided into two groups: the treatment group was given the juice of the yellow passion fruit peels of 250 ml/day and education for 7 days, and the control group was given education only. The defecation patterns were measured before and analyzed using Wilcoxon paired t-test in order to compare the result of the Mann Whitney independent t-test was used to compare the defecation patterns between the treatment group and the control group. The research results revealed that the treatment with the juice of the yellow passion fruit peels in the intervention showed a mean increase of defecation frequency in the treatment group was from 3.7 to 6.3 times, while in the control the difference between the groups was significant (p<0.05). The feces consistency also showed a significant difference within the intervention group before and after the intervention (p<0.05), whereas there was no significant difference within the control group (p>0.05). As for the straining strength, the two groups showed no significant difference before the intervention, but the two groups showed a significant difference after the intervention (p<0.05).

Keywords: Defecation patterns; Diabetes mellitus; Fiber; Yellow passion fruit peels

Introduction

Economic progress as a result of development in developing countries as in Indonesia leads to improved lively hood sand patterns of human life especially in big cities1,2. Improving the welfare of the population in developing countries has led to changes in living standards, service to society, and lifestyle changes, from traditional life style to sedentary life style1. This lifestyle is characterized by a lack of physical activity as well as dietary deviations ie intake tends to high energy and low fiber that triggers obesity and implies the onset of degenerative diseases1. Modern lifestyles and high activity levels require individuals to do practical things including food consumption2. According Muchtadi1, changes in lifestyle impact on changes in consumption patterns of society.

Based on data from RISKESDAS4, consumption behavior of vegetables and fruits which is a source of fiber is still relatively low in Indonesia is still less than amount required by Nutritional Sufficiency (AKG), which is at least 25 grams of fiber per day. The results of the study by Nutrition Center of ministry of health showed that the average consumption of Indonesian fiber per day was only 10.5 g or just one third of the recommended fiber intake 25-35 g per day5. The data from RISKESDAS4,show that the proportion of population is predominant≥10 years less eating vegetables and fruits of 93.5% did not show a large difference from the year 2007 amounted to 93.6%. For South Sulawesi Province, the proportion of consuming less fruits and vegetables has increased in 2013 with 96.7% prevalence from the year 2007 amounted to 93.1%4.

Corresponding author:
Rahma
E-mail: rrara82@gmail.com
One of the degenerative and metabolic diseases that are often associated with low fiber consumption is diabetes mellitus disease. According to World Health Organization (WHO), Indonesia is the second largest country after India that has the most DM patients i.e. 8,426,000 people in Southeast Asia, and is expected to increase to 21,257,000 by 2030.

High-fiber diet has gained great attention in recent years due to its association with an increased incidence of some metabolic disorders such as hypertension, diabetes, obesity, dyslipidemia, heart disease and colon cancer. Fiber serves to slow digestion, filling the stomach and slowing hunger. The fiber diet can be used in the treatment and prevention of many diseases such as obesity, heart disease, type 2 DM, colonic diverticulosis, and constipation.

Passion fruit waste processing in Indonesia is generally processed as animal feed. Meanwhile, in some other countries have utilized yellow passion fruit bark waste (Passiflorae dululis f. Flavicarpa deg.) as a form of intervention to enhance the body metabolism. Research conducted by de Souza showed 30 gr / day of passion fruit shoots for two months in type 2 diabetics to help lower insulin resistance and showed significant differences in fasting blood glucose during the treatment period.

Yellow passion fruit has a fiber content of 17.4 grams in 30 grams for total fiber, 6.3 grams of water soluble fiber, and 11.1 grams of water insoluble fiber. The content of yellow passion fruit leather fiber is higher than other vegetables and fruits per 100 grams for total fiber, such as melinjo contains 21 grams, pare contains 8.4 grams, wine contains 6 grams, red apples contain 1.49 grams, star fruit contains 9.31 grams, guava contains 22.50 grams, passion fruit contains 19.95 grams, mangosteen contains 20.40 grams, pear 11.05 grams, papaya contains 4.75 grams, and avocado contains 24.8 grams. Juice is one form of processed food that is easy to consume and is spent because it is in liquid form. Consistency of juice in the form of liquid causes cellulose cell walls of the fruit to be destroyed and dissolved so easily digested by the stomach and gastrointestinal tract.

Currently there is no home industry or company in Indonesia that produces juice by using passion fruit skin. For that passion fruit juice will produce drinks rich in fiber. This juice will be one of the beverages that are rich in health benefits that can increase daily fiber intake and are favored by the community. Based on the above description, the researchers are interested to examine the relationship of yellow passion fruit juice (Passiflorae dululis f. Flavicarpa deg.) on the pattern of defecation in DM patients in Puskesmas in Pinrang District.

**Methodology**

**Research Type**

The type of research used in this study is an experimental study with a quasi-experimental research design (Quasy Experiment). The research design model is a non-randomized group pre-post test with control group design.

**Location and Time of Study**

The preliminary study was conducted during May to July 2015. Intervention of Kunisakunisa skin juice product was conducted in August 2015. The research site for proximate test, yellow passion fruit skin test is done at Integrated Laboratory of Hasanuddin University Public Health Faculty and Health Laboratory of South Sulawesi. For the manufacture of yellow passion fruit juice and organoleptic done in the Laboratory of Nutrition Culinary Faculty of Public Health Hasanuddin University. Intervention of yellow passion fruit juice was performed on DM patients in Pinrang District.

**Population and Sample Research**

As population in this research is all patient of DM which treatment in PKM one last year. The sample of this research is the respondents who were treated consisting of adults with a defect pattern of less than 7x a week. So, the minimum sample size is 36 people.

**Materials and Implementation**

The material in this research is the mesocarp (white / albedo) part of yellow passion planted in MalakajiGowa regency of South Sulawesi. The material used in this research is yellow passion fruit taken directly from passion fruit factory in Makassar City and still fresh, not dry and decaying. The chemicals used are 95% ethanol, N2 gas, refined filter paper, ethanol pro analysis, 1.25% H2SO4, 3.25% NaOH, aquadest, 1% HCl, concentrated HCl, 95% alcohol. Each respondent who entered the intervention group was given yellow passion fruit juice
as much as 250 ml for 7 days, and given education about DM conducted in counseling / individual. Education is done at the time of taking blood and at recall 24 hours.

Respondents were given a juice drink control card to be filled each time the respondent drank a yellow passion fruit juice containing the day and date of drinking juice and the amount of juice taken. Researchers distributed juice between 14:00 to 16:00 and watching / waiting for the respondent to drink juice until it runs out. Each respondent who entered the control group was given education about DM done at the time of taking blood and at recall 24 hours. Education is done individually / counseling. In addition 24-hour recall was conducted for 3 days determined on certain days i.e. 2 days during the intervention (holidays, working days) and 1 day after intervention to know the description of food intake, both the treatment group and the control group.

Processing and Data Analysis

Table 1. Differences of Respondents’ Intake among Prior Groups Intervention

<table>
<thead>
<tr>
<th>Nutrient intake</th>
<th>Groups</th>
<th>Intervention Mean ± SD</th>
<th>Control Mean ± SD</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td></td>
<td>1297.33 ± 116.48</td>
<td>1259.49 ± 126.22</td>
<td>0.277</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td></td>
<td>213.32 ± 27.91</td>
<td>202.18 ± 18.68</td>
<td>0.06</td>
</tr>
<tr>
<td>Fat (g)</td>
<td></td>
<td>25.87 ± 9.51</td>
<td>23.44 ± 11.77</td>
<td>0.499</td>
</tr>
<tr>
<td>Protein (g)</td>
<td></td>
<td>52.26 ±9.78</td>
<td>50.84 ±9.20</td>
<td>0.840</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td></td>
<td>6.76 ±4.33</td>
<td>5.98 ±3.13</td>
<td>0.715</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td>1.75 ± 0.44</td>
<td>1.85 ± 0.37</td>
<td>0.435</td>
</tr>
</tbody>
</table>

Change of Average Intake before and After Intervention

The results of the study in Table 2 showed that the mean intake of nutrients consisting of energy, carbohydrate, fat, protein decreased after intervention, but statistically showed an insignificant decrease in mean p> 0.05 in fat and protein. While on energy and carbohydrate have a significant decrease that is with value of p <0.05. For fiber increased intake after intervention, statistic showed significant improvement with indigo p <0.05.

White water intake in the intervention group experienced an average change in intake before and interventions but statistically did not show significant improvement with p> 0.317. In the control group, the average change in energy intake, carbohydrate and fiber decreased before and after intervention, but statistically did not show a significant decrease with p> 0.05. While the intake of fat, protein and water show the average change in the increase before and after intervention. Statistically, however, it did not show a significant increase due to the value of p> 0.05.

Ethical Considerations: The study was conducted with the permission of the Ethical Committee of Faculty of Medicine UNHAS No. Register UH 15060473.

Result and Discussion

Differences of Respondents Intervention between Groups before Intervention

The results In Table 1 showed that the nutritional intake and water of the respondents between the intervention group and the control group did not show significant differences with p> 0.05.
Table 2. Change of Average Intake before and after Intervention

<table>
<thead>
<tr>
<th>Nutrient intake</th>
<th>Intervention Group</th>
<th>p value</th>
<th>Control Group</th>
<th>p value</th>
<th>p value intervention &amp; control (post)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Mean ± SD</td>
<td>Post Mean ± SD</td>
<td>Pre Mean ± SD</td>
<td>Post Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Energy (kcal)</td>
<td>1297.33 ± 116.48</td>
<td>1212.16 ± 86.14</td>
<td>0.017</td>
<td>1259.49 ± 126.22</td>
<td>1219.78 ± 89.72</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>213.32 ± 27.91</td>
<td>191.36 ± 20.45</td>
<td>0.03</td>
<td>202.18 ± 18.68</td>
<td>195.21 ± 19.53</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>25.87 ± 9.51</td>
<td>24.16 ± 6.64</td>
<td>0.505</td>
<td>23.44 ± 11.77</td>
<td>23.71 ± 11.59</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>52.26 ± 9.78</td>
<td>51.05 ± 11.94</td>
<td>0.478</td>
<td>50.84 ± 9.20</td>
<td>51.69 ± 7.51</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>6.76 ± 4.33</td>
<td>12.09 ± 2.64</td>
<td>0.001</td>
<td>5.98 ± 3.13</td>
<td>5.29 ± 1.81</td>
</tr>
<tr>
<td>Water</td>
<td>1.75 ± 0.44</td>
<td>1.80 ± 0.41</td>
<td>0.317</td>
<td>1.85 ± 0.37</td>
<td>1.90 ± 0.31</td>
</tr>
</tbody>
</table>

Picture of Elimination / Frequency of Defecation Patterns, Straining and Consistency of Feces

The results of the study in Table 3 showed that the frequency distribution of respondent defecation before intervention in the intervention group has defect frequency 2-5 times in seven days i.e. 5% (2 times), 40% (3 times), 35% (4 times) and 20% (5 times). In the control group the frequency distribution of defecation before the intervention had defect frequency 3-5 times in seven days i.e. 35% (3 times), 40% (4 times) and 20% (5 times). In the control group the frequency distribution of defecation before the intervention had defect frequency 3-5 times in seven days i.e. 35% (3 times), 40% (4 times) and 20% (5 times). The frequency distribution of defecation after the intervention shows the most frequent change of frequency of defects is the change in frequency to be 7 times a week that is 60% (7 times). While in the control group the most frequent defect frequency picture is 4 times a week 40%. The results showed that the strength of respondents before intervention in the control and intervention groups showed the same percentage of 20% strong straining and 80% who did not push. While the percentage of straining strength after intervention showed in the intervention group experiencing an improvement change that is 100% of respondents experiencing no push. While in the control group showed no change in strength pushing before and after intervention done. Result shows the consistency of the feces before intervention in the intervention group by 40% hard and 60% soft. After intervention, the consistency of feses presentation in the intervention group was changed by 0% hard, 85% soft and 15% liquid. While in the control group consistency of feses before and after intervention did not show percentage change that is 20% hard and 80% soft.

Table 3. Frequency of Defecation

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Intervention Group</th>
<th>p value</th>
<th>Control Group</th>
<th>p value</th>
<th>p value (between groups) before intervention</th>
<th>p value (between groups) after intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of Defecation</td>
<td>3.70±0.86</td>
<td>6.35±0.93</td>
<td>0.00</td>
<td>3.90±0.79</td>
<td>4.35±0.99</td>
<td>0.021</td>
</tr>
</tbody>
</table>
Results of Analysis of Difference in Frequency of Respondents Intervention and Control Before and After Intervention

The results of this study showed that statistically the frequency of defecation in the intervention group before and after the intervention showed a significant difference with the value of \( p < 0.05 \). The average frequency of defecation of respondents in the intervention group increased from 3.7 times to 6.4 times in seven days. While in the control group statistically also showed a significant difference in frequency of defecation before and after intervention with \( p < 0.05 \). However, the increase in the frequency of defecation in the control group for seven days was lower than that of the intervention group, which increased 3.90 times to 4.35 times a week. The frequency of defecation before intervention between the control group and the statistical intervention showed no difference \( p > 0.05 \) whereas after intervention the frequency of defecation between the control group and the intervention showed a significant difference with the value of \( p < 0.05 \). This suggests that the education of the control group influences the frequency of defecation of the control group.

Result of Strength Analysis between Respondents Intervention and Control Group

The results of the study showed that the strength of respondents before and after intervention and control did not show significant changes with the value of \( p > 0.05 \). The strength of push between the intervention group and the control group before the statistical intervention also did not show significant difference with the value of \( p > 0.05 \), while the strength of push between the control group and intervention after the intervention was done statistically showed a significant difference with the value of \( p < 0.05 \).

Result of Strength Analysis between Respondents Intervention and Control Group

The results of the study showed that the consistency of hard feces in the intervention group as much as 8 respondents and the flabby as much as 12 respondents but after the intervention of respondents who have hard feces consistency (decreased) and the softening increased to 17 respondents as well as the consistency of the liquid feces 3 respondents. Based on statistical test of change of consistency of feces in intervention group showed significant change before and after intervention with \( p < 0.05 \). While the control group consistency of feces of respondents did not show significant changes before and after intervention with \( p > 0.05 \).

Overall Discussion

The juice in this study uses a yellow Passion Fruit Passifloraeedulis Flavicarpa Degener taken from MalakajiGowa. Based on the Decree of Minister of Agriculture No.583 / Kpts / Tp.240 / 7/1994 this yellow leather passion fruit is one of the leading varieties plant in Malino, Gowa Sulawesi Selatan.\(^{14}\) According to Simmakyand Jaanaki\(^{15}\), passiflora passion fruit is an exotic fruit with a distinctive flavor and grows in the tropics and sub tropics.

Characteristics of respondents in this study were women with type 2 diabetes with the distribution of age 36-65 years. Based on a study conducted by Maleki\(^{16}\), the prevalence of constipation was higher in diabetic patients than those who did not have diabetes. Result of this analysis has indicated that yellow passion fruit juice can increase the frequency of defecation of DM patients. According to Gropper and Smith\(^{17}\), the consumption of soluble and insoluble fiber can retain water in the intestine thus increasing the volume of the stool and reducing the transit time of food waste in the intestine which can increase the frequency of defecation.

Conclusion

The discovery of yellow passion fruit juice can be one alternative drink that can increase daily fiber intake of patients with type 2 diabetes. Yellow passion fruit juice with 250 ml serving sizes can improve the pattern of defecation of patients with type 2 diabetes, which increases the average frequency of defecation of 3.7 times to 6.3 times a week and improves the consistency of the feces from hard to soft and fluid. The yellow passion fruit juice did not show any effect on the straining force of people with type 2 diabetes.

Acknowledgment: The author would like to extend the appreciation to all the participants from Puskesmas in Pinrang District as well as Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil
References

2. Sebayang AN. Description of Patterns Consuming Student Foods at the University of Indonesia. Indonesian University: Jakarta. 2012.
3. Masluha D. Seaweed-based Jelly Drink Formulations (Eucheuma Cottonii) and Spirulina platensis. 2013.
The Giving of Exclusive Breastfeeding to Moronene Etnics of Bombana Southeast Sulawesi

Ratnawati1, Indar1, Burhanuddin Bahar1

1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

Breast milk is the best food for babies up to 6 months old. The aim of this work is to examine various factors affecting the giving of exclusive breastfeeding to Moronene Etnics of Bombana, Southeast Sulawesi. The research was a quantitative study with survey analytic design and cross sectional approach design. The sample consisted of 144 samples of mother having infants above 6 months old. They were selected using proportional random sampling technique and they represent all villages in the work area of Rumbia Health Center. The primary data were collected through interview and secondary data were obtained through library study. The results of the research indicate that exclusive breastfeeding is very low (16.0%). There is a correlation between knowledge, social support and exclusive breastfeeding (p=0.000). Socio-cultural factor has the most dominant effect on exclusive breastfeeding (p=0.000, B=3.841), while socio-demographical factor of mothers (mother’s age and parity) does not have a significant correlation with exclusive breastfeeding.

Keywords: Bombana; breastfeeding; moronere ethnics; socio-cultural

Introduction

Babies are one of the groups that are susceptible to health problems and disease attacks. Infants and toddlers’ health should be monitored to ensure their health is always at optimal levels. Infant health care is one of several indicators that can be a measure of the success of efforts to improve the health of infants and toddlers. Infant care is aimed at infants aged 29 days to 11 months by providing health services in accordance with standards by health personnel with health clinical competence (doctors, midwives, and nurses), counseling of infant health care and exclusive breastfeeding, complementary feeding and others. The infant formula category begins to receive breast milk according to Riskesdas 2013 is less than 1 hour (Initiation of Early Breastfeeding / IMD), between 1 to 6 hours, 7 to 23 hours, 24 to 47 hours and equal to or more than 47 hours1.

The results of research Karen M. Edmond2 said early initiation of breastfed infants can reduce neonatal mortality. All causes of neonatal mortality can be reduced by 16.3% if all infants breastfeed on the first day of birth and by 22.3% if initiation takes place within the first hour2. The first time to get breastmilk soon after birth significantly improves the baby’s chances of survival. If the baby starts breastfeeding within 1 hour of birth, 22% of babies who die within the first 28 days (equivalent to about one million newborns each year in the world) can be prevented. If the breastfeeding process begins within the first day, only 16% of babies can be saved2. Although the proportion of infants who had received high milk was 95.7%, but the proportion of exclusive breastfeeding in infants 0-6 months was still low at 32.4%, as well as the proportion of breast-fed infants around 1 hours after birth is 43.9%3. Not giving colostrum is one of the most commonly detrimental habits. Breastfeeding may reduce neonatal mortality by 55-87%4.

The Government of Indonesia supports the WHO and UNICEF policies that recommend early breastfeeding initiation as “life-saving” measures, since early breastfeeding initiation can save 22% of babies who die before the age of one month. So it is expected all health workers in all levels of health services can socialize the program. The result of Riskesdas states that the percentage of the process begins to get milk less than an hour (early breastfeeding initiation) in children aged
0-23 months in Indonesia in 2013 amounted to 34.5%. The percentage of process started to get ASI between 1-6 hours by 35.2%, the percentage of process started getting breast milk between 7-23 hours by 3.7%, while the percentage of process started getting milk between 24-47 hours by 13.0% and percentage the process began to get milk more than 47 hours by 13.7%. The percentage of the process of getting breastfed less than an hour (early initiation of breast feeding) was highest in West Nusa Tenggara (52.9%) followed by South Sulawesi (44.9%) and West Sumatera (44.2%). Meanwhile, the lowest percentage of early initiation of breastfeeding in West Papua province was 21.7%, Southeast Sulawesi province 33.2% below the national rate (34.5%)^5.

Breastfeeding Global World Health Organization report (WHO) in 2012 (De Onis et al.; Cai et al.) stated that the target of achieving global Exclusive Breastfeeding coverage is at least 50% by 2025, factors contributing to the low achievement of exclusive breast milk coverage of socio-cultural, health systems and political policies. These factors include public confidence that babies need food / drinks other than breastmilk, the practice of health services that do not support Exclusive breastfeeding programs, knowledge of health workers and the community about exclusive breastfeeding, lack of policy support governing maternal support efforts in exclusive breastfeeding^7.

Several other studies on factors affecting the success of exclusive breastfeeding in infants, among others, research conducted by Afifah^8 found that the mother’s knowledge about Exclusive Breast Milk can be obtained from various sources of information. The low knowledge of mothers on Exclusive breast milk, at the same time they have local cultural knowledge of food ideology for babies. This local cultural knowledge can hinder the practice of exclusive breastfeeding. Satino’s^9 research results show that age, education, occupational, knowledge, behavioral and environmental factors influence exclusive breastfeeding Another study conducted by Suratno^10, in Padang that husband support has an influence on Exclusive breastfeeding.

Hector^11 work has demonstrates greater significance of social, cultural and environmental factors in influencing the mother’s decision to breastfeed, how long breastfeeding and exclusive breast feeding. Socio-cultural and environmental factors contribute greatly to health problems in identifying factors that affect exclusive breastfeeding. Thus, The general objective of this study was to examine the various factors affecting the exclusive breastfeeding of Moronene Bombana Southeast Sulawesi.

**Methodology**

**Research Type**

The research method used is quantitative research method with analytical survey research design aims to describe the phenomenon found in the form of risk factors, effects or results and then search the relationship between variables^12. The approach used in this study is cross sectional analytic study to identify whether or not there is relationship between independent variables, influencing factors that are social culture, social support, social characteristics of mother’s demography (mother age and parity), knowledge with dependent variable of giving Exclusive Breast Milk^13.

**Location and Time**

The selection of case study sites was conducted in the working area of Rumbia Health Center, Bombana Regency, Southeast Sulawesi Province. This research was done from in January until May 2016.

**Population and sample**

The populations in this study were all mothers who had babies over 6 months in Bombana District Southeast Sulawesi Province. Target population is the number of mothers who have babies over 6 months in Rumbia Health Center working area of 231 mothers. Sample in this research is part of mother who have baby over 6 month in working area of Rumbia Health Center of Bombana Regency Southeast Sulawesi Province at the time of research. So the number of samples required in this study is as many as 144 people.

**Data Collection**

Primary data were collected using a research questionnaire containing information on respondents’ identities (name, age, gender, education, occupation), socio-cultural, social support, social characteristics of maternal and maternal demographics and mother’s knowledge of Exclusive breastfeeding. Qualitative data was obtained through in-depth interviews to obtain additional information supporting questions in the questionnaire. Secondary data were obtained from health
profiles of Rumbia Puskesmas, Exclusive Breastfeeding coverage report of Rumbia Puskesmas and Exclusive Breastmilk coverage report of Bombana district, general data of BPS Bombana district.

Data Analysis

The data obtained was processed using SPSS version 20.0. Bivariate analysis was done by using chi-square analysis to see the relationship between dependent and independent variables. Hypothesis test on each analysis result using 95% confidence level ($\alpha = 0.05$), hypothesis accepted if $p < 0.05$. Multivariate analysis was done to know together independent variable related to dependent variable or see effect of independent variable to dependent variable and know the most significant variable to Exclusive breastfeeding. The analysis model used is the analysis of Multiple Logistic Regression (logistic regression), where the dependent variable is a dichotomous / binary category.

Result and Discussion

Bivariate Analysis

Socio-cultural relationship with Exclusive breastfeeding

Table 1 shows that respondents who did not give exclusive breastfeeding stated that there were socio-cultural factors that impedes exclusive breastfeeding, ie 90 respondents (96.8%) than those who stated that there are socio-cultural factors that inhibit exclusive breastfeeding of 31 respondents (60.8 %). The respondents who gave exclusive breastfeeding stated that there were no socio-cultural factors that prevented the exclusive breast feeding of 20 respondents (39.2%) compared to the stated social-cultural factor which inhibited Exclusive Breastfeeding 3 respondents (3.2%). Chi square test results obtained $p$ value = 0.00 ($p < 0.05$) which means Ho rejected. This shows that there is a social-cultural relationship with the status of Exclusive breastfeeding.

Table 1. Socio-Cultural Relations with Exclusive Breastfeeding In The Working Area of Rumbia Health Center of Bombana Regency Year 2016

<table>
<thead>
<tr>
<th>Socio-cultural</th>
<th>Exclusive Breastfeeding</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Exclusive</td>
<td>Exclusive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>90</td>
<td>96.8</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>31</td>
<td>60.8</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>84.0</td>
<td>23</td>
</tr>
</tbody>
</table>

b) Age group relationship with Exclusive breastfeeding

The age group relationship with Exclusive breastfeeding can be seen in the Table 2 whereby results shows that respondents who did not give Exclusive Breast Milk had more age group less than 25 years old ie 19 respondents (86.4%) than age group more than or equal to 25 years that is 102 respondents (83.6%). The respondents who gave exclusive breastfeeding had more age group more than or equal to 25 years ie 20 respondents (16.4%) than the age group less than 25 years ie 3 respondents (13.6%). Fisher’s exact test results obtained $p$ value = 1.000 ($p > 0.05$) which means Ho accepted. This indicates that there is no relationship between maternal age and exclusive breastfeeding status. This means that there is no difference between ages less than 25 years and more or equal to 25 years on Exclusive breastfeeding.
Table 2. Relationship of Age Group with Exclusive Breastfeeding In Working Area of Rumbia Community Health Center of Bombana Regency Year 2016

<table>
<thead>
<tr>
<th>Age group</th>
<th>Exclusive Breastfeeding</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Exclusive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>&lt;25</td>
<td>19</td>
<td>86.4</td>
<td>3</td>
</tr>
<tr>
<td>≥ 25</td>
<td>102</td>
<td>83.6</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>84.0</td>
<td>23</td>
</tr>
</tbody>
</table>

Parity relationship with Exclusive breastfeeding

Parity relationship with Exclusive breastfeeding can be seen in Table 3 whereby results shows that respondents who do not give Exclusive Breast Milk have multiparent parity that is 78 respondent (84.8%) compared to primipara parity that is 43 respondent (82.7%). The respondents who gave exclusive breastfeeding had more primipara parity with 9 respondents (17.3%) than the multiparous parity of 14 respondents (15.2%). Chi square test results obtained p value = 0.742 (p> 0.05) which means Ho accepted. This shows that there is no parity relationship with the status of exclusive breastfeeding.

Table 3. Relationship Parity with Exclusive Breastmilk in Work Area of Rumbia Puskesmas Kabupaten Bombana Year 2016

<table>
<thead>
<tr>
<th>Parity</th>
<th>Exclusive Breastfeeding</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Exclusive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Primipara</td>
<td>43</td>
<td>82.7</td>
<td>9</td>
</tr>
<tr>
<td>Multipara</td>
<td>78</td>
<td>84.0</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>84.0</td>
<td>23</td>
</tr>
</tbody>
</table>

Social support relationship with Exclusive breastfeeding

The relationship of social support with exclusive breastfeeding can be seen in Table 4 whereby the decision shows that respondents who do not give Exclusive Breast Feed say less social support in exclusive breastfeeding is 70 respondents (94.6%) than those who stated enough social support in exclusive breastfeeding is 51 respondents (72.9%). Respondents who exclusively breastfed, were more likely to express sufficient social support in the exclusive breastfeeding of 19 respondents (27.1%) than those who expressed less social support in exclusive breastfeeding, ie 4 respondents (5.4%). Chi square test results obtained p value = 0.00 (p <0.05) which means Ho rejected. This suggests that there is a social support relationship with the status of exclusive breastfeeding. Chi square test results obtained p value = 0.00 (p <0.05) which means Ho rejected. This suggests that there is a social support relationship with the status of exclusive breastfeeding.
Table 4. Relationship of Social Support with Exclusive Breastfeeding In The Work Area of Rumbia Puskesmas Kabupaten Bombana Year 2016

<table>
<thead>
<tr>
<th>Social support</th>
<th>Exclusive Breastfeeding</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Exclusive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Less</td>
<td>70</td>
<td>94.6</td>
<td>4</td>
</tr>
<tr>
<td>Sufficient</td>
<td>51</td>
<td>72.9</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>84.0</td>
<td>23</td>
</tr>
</tbody>
</table>

e) Knowledge relationship with Exclusive breastfeeding

Knowledge relation with exclusive breastfeeding can be seen in table 5. The result shows that respondents who do not give exclusive breastfeeding have less knowledge that is 85 respondents (95.5%) than those having enough knowledge that is 36 respondent (65.5%). The respondents who gave exclusive breastfeeding had better knowledge of 19 respondents (34.5%) than those with less knowledge of 4 respondents (4.5%). Chi square test results obtained p value = 0.00 (p <0.05) which means Ho rejected. This suggests that there is a relationship of knowledge to the status of exclusive breastfeeding.


<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Exclusive Breastfeeding</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non Exclusive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Less</td>
<td>85</td>
<td>95.5</td>
<td>4</td>
</tr>
<tr>
<td>Sufficient</td>
<td>36</td>
<td>65.5</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>84.0</td>
<td>23</td>
</tr>
</tbody>
</table>

Multivariate Analysis

Multivariate analysis is an analysis involving more than two independent variables with the dependent variable. Multivariate analysis aims to determine the most dominant variables associated with exclusive breastfeeding status. The requirement to participate in multivariate analysis is the variable having p value at bivariate test (chi square test) <0.250. The result of chi square analysis shows that socio-cultural variables, social support and knowledge have p value <0.250. Table 6 shows the results of statistical tests with multiple logistic regression on the status of exclusive breastfeeding. Of the three variables tested by multiple logistic regression, only two variables remained in contact with exclusive breastfeeding status ie socio-cultural and social support. Of these two variables most closely related to exclusive breastfeeding status are socio-cultural values B = 3.84 and Wald = 20.15.

Table 6. Most Associated Factor With Exclusive Breast-Feeding Status In The Working Area of Rumbia Health Center Kabupaten Bombana Year 2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Wald</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-cultural</td>
<td>3.841</td>
<td>20.146</td>
<td>0.000</td>
</tr>
<tr>
<td>Social support</td>
<td>2.977</td>
<td>12.913</td>
<td>0.000</td>
</tr>
<tr>
<td>Knowledge</td>
<td>0.748</td>
<td>0.974</td>
<td>0.324</td>
</tr>
<tr>
<td>Constant</td>
<td>-13.664</td>
<td>36.804</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Overall Discussion

This study is in line with research conducted Afifah\(^8\) found that although mothers have knowledge about the importance of breastfeeding, they also have local cultural knowledge of food ideology for infants. This local cultural knowledge may be called an obstacle to the practice of exclusive breastfeeding. Research by Kehler et al\(^{14}\). found that maternal age had an effect on exclusive breastfeeding. Mothers aged ≥25 years tend to breastfeed to their babies, because they have better emotional and mental health maturity than younger mothers <25. Research by Kuan et al\(^{15}\). shows an aged mother <25 years has a 2.3 times greater chance of breastfeed failure exclusive compared to mothers aged>25 years.

The same study by Fahriani et al\(^{16}\). found that the absence of a relationship between parity and exclusive breastfeeding is due to the number of primiparous mothers comparable to multiparous mothers in terms of exclusive breastfeeding. Research by Al- Sahab et al\(^{17}\). found the multiparous mother group was 2.6 times more likely to exclusively breastfeed than primiparas. Study by Rosane et al\(^{18}\). found successful practices of exclusive breastfeeding 1.5 times greater when supported by husbands. Similar findings of research at Sukarama District Health Center Tasmalakya District, exclusive breastfeeding 2.9 outcomes in maternal groups supported by husband\(^{19}\). This study is similar to the results of research Wulandari et al\(^{20}\). which states that there is a significant relationship between knowledge variables with exclusive breastfeeding variable.

Conclusion

Based on the result of research, it can be concluded that exclusive breastfeeding by mothers on Morone tribe in the work area of Rumbia Health Center is still very low. In addition, there is influence of a socio-cultural, social support and knowledge on exclusive breastfeeding on Exclusive Breastfeeding of Moronene in the work area of Rumbia Health Center. However, there is no maternal social influence (mother’s age and parity) on Exclusive Breastfeeding of Moronene in the work area of Rumbia Health Center. Also, Socio-cultural factors are the most influential variable on Exclusive Breastfeeding on Moronene Tribe in the work area of Rumbia Puskesmas.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

5. RI Ministry of Health. Exclusive situations and analysis of ASI.
8. Nur Afifah D. Factors that Play a Role in Failure to Practice Exclusive Breastfeeding (Qualitative Study in Tembalang District, Semarang City in 2007). SUAR. 2007;3(1).


The Effects of Soybean Chocolate Drink Treatment on the Calcium Levels in Patients with Pulmonary Tuberculosis

Rezky Amelia¹, Nurpudji A. Taslim¹, Citrakesumasari¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of study is to analyze effect of soybean chocolate drinks on calcium level in blood of patients with pulmonary tuberculosis in Makassar. The study was used quasi-experiment with pre-post test (a Quasi-Experimental Design with pre-posttest), which was conducted on 34 patients with pulmonary tuberculosis. The patients were divided into two groups and each group consisted of 17 patients. The intervention group received soybean chocolate drinks of 100 grams/day with nutrient education, and control group only received nutrient education for 30 days. The data of the food intakes and the food recalls of 24 hours were collected during the intervention. There occurred an increase in the calcium intakes by both intervention and control group of the patients with pulmonary tuberculosis. Meanwhile, calcium level in the intervention group had experienced an increase. The statistical analysis of the comparison in calcium levels before and after intervention in both groups was insignificant (p=0.169). The comparison between calcium intakes before and after intervention in both groups was significant (p=0.000). Thus, the treatment with soybean chocolate drinks had no effect on the calcium levels in the patients of pulmonary tuberculosis.

Keywords: Calcium level; Pulmonary tuberculosis; Soybean chocolate drinks.

Introduction

The pulmonary tuberculosis (TB) was an acute or chronic disease that affected the respiratory system. The disease was recorded increased every year¹. There were 9.4 million cases and 1.7 million deaths globally in 2009. The most deaths were recorded in developing countries with limited resources. Besides, Africa continent was recorded double pulmonary TB cases compared to Southeast Asia, 35 per 100,000 populations. In 2011, prevalence in TB with positive bladder tumor antigen (BTA) was 289 per 100,000 population. The pulmonary TB cases rate was 189 per 100,000 population and mortality rate were 27 per 100,000 population². In some studies, pulmonary TB disease was correlated with hypocalcemia. The pulmonary TB patients showed low level than reference in Japan³. Furthermore, the calcium level in blood in pulmonary tuberculosis patient was lower than control group³. The pulmonary TB patients had low calcium level had high risk in death⁴. In addition, Rohini⁴ found that low in calcium level in the pulmonary TB patient’s blood affected calcium availability for phagolysosome maturation. The calcium signaling was required to increased T cell proliferation and immunologic synapse stability⁵.

The calcium plays an important role in phagocytosis process.⁶ The calcium signaling also affected regulation of T cell activation, tolerance and homeostasis⁷. The high protein food such as soy improved nutritional status in pulmonary TB patients⁸. Besides, soy had functioned to repair cells, tissues, immune system and acted as antioxidants⁹. The soybean is very suitable processed into beverages because soy protein had an amino acid structure. The soy and chocolate combination had increased calcium intake in pulmonary tuberculosis patients. The author had conducted study to analyze the effect of soybean chocolate drinks on the calcium level in blood of the patients with pulmonary tuberculosis in Makassar.

Methodology

Study Type

This study was a clinical trial study or interventional study to determine effect of soy chocolate drink in
calcium level in patients with pulmonary tuberculosis. The anthropometric status was taken on pre and post study. The study subject were divided into two groups included intervention and control groups. The intervention group had received soy chocolate drink and education, while control group only received education.

**Location and Time**

This study was conducted from February to June 2014 at Community Center for Lung Health Makassar city.

**Population and Sample**

The population in this study was pulmonary tuberculosis patients in Community Centre for lung Health Makassar city. The samples sizes were 34 pulmonary tuberculosis patients. The samples were selected by purposive sampling method. The inclusion criteria for this study as below:

i) Male and female aged between 18 year and 60 years;

ii) The patients with pulmonary tuberculosis;

iii) Willing to participate in this study.

**Data Analysis**

The data was analyzed by using SPSS program, while food consumption data is processed with Nutrisurvey computer program. The statistical test is using to observe changes in calcium levels pre and post intervention by paired T-test. The difference of calcium level between intervention and control group that analyzed by independent T test.

**Result and Discussion**

**Bivariate Analysis**

Table 1 and Table 2 showed mean of energy intake, carbohydrate, protein, fat and calcium before and after intervention in both groups. Both groups had experienced increment in energy, protein, fat, carbohydrate and calcium. The energy was observed increased from 1,308.0 kcal to 2,119.50 kcal in the intervention group, while energy in control group increased from 1,238.0 kcal to 2,014.62 kcal. In intervention group, protein had increased from 42.72 gram to 97.20 gram and control ground had observed increment in protein from 42.70 gram to 68.72 gram. Meanwhile, fat intake had increased from 24.30 gram to 56.20 gram in intervention group, while fat intake increased from 20.80 gram to 45.37 gram in control group. The carbohydrate intake increased from 224.02 gram to 280.02 gram in intervention group in intervention group while, carbohydrate intake increased from 216.60 gram to 328.50 gram in control group. The increment had observed in calcium intake among intervention group from 239.5 mg to 696.16 mg and calcium intake increased from 137.5 mg to 288.85 mg in control group. The consumption of nutrients was increased after intervention and showed significant (p=0.000). The carbohydrate, protein and calcium intake showed significant value.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre Test</th>
<th>Post test</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>1,308.0</td>
<td>2,119.50</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>1,238.0</td>
<td>2,014.62</td>
<td>0.000</td>
</tr>
<tr>
<td>Protein (gram)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>42.72</td>
<td>97.20</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>42.70</td>
<td>68.72</td>
<td>0.000</td>
</tr>
<tr>
<td>Fat (gram)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>24.30</td>
<td>56.20</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>20.80</td>
<td>45.37</td>
<td>0.000</td>
</tr>
<tr>
<td>Carbohydrate (gram)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>224.02</td>
<td>280.20</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>216.60</td>
<td>328.50</td>
<td>0.000</td>
</tr>
<tr>
<td>Calcium(mg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>239.5</td>
<td>696.16</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>137.5</td>
<td>288.85</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Primary data, 2014
Table 2. Comparison analysis of mean energy intake, macro and calcium nutrients in intervention and control groups before and after intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Δ</th>
<th>p value**</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy (kcal)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>811.34±175.33</td>
<td>0.538</td>
</tr>
<tr>
<td>Control</td>
<td>776.86±146.04</td>
<td></td>
</tr>
<tr>
<td><strong>Protein (gram)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>54.55±12.41</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>25.93±15.02</td>
<td></td>
</tr>
<tr>
<td><strong>Fat (gram)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>31.96±16.61</td>
<td>0.126</td>
</tr>
<tr>
<td>Control</td>
<td>24.56±10.01</td>
<td></td>
</tr>
<tr>
<td><strong>Carbohydrate (gram)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>56.26±49.13</td>
<td>0.001</td>
</tr>
<tr>
<td>Control</td>
<td>111.83±33.26</td>
<td></td>
</tr>
<tr>
<td><strong>Calcium (mg)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>456.61±208.33</td>
<td>0.000</td>
</tr>
<tr>
<td>Control</td>
<td>151.29±69.13</td>
<td></td>
</tr>
</tbody>
</table>

* T dependent test

**independent T test

Source: Primary data, 2014

Based on Table 3 and 4, calcium level was observed increased in the intervention group. In contrast, the calcium level in control group was decreased after intervention. The statistical test showed in both groups were not significant (p=0.169>0.05).

Table 3. Analysis of calcium level in intervention and control groups before and after interactions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre Test</th>
<th>Post test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium (mg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>9.41±0.45</td>
<td>9.43±0.94</td>
</tr>
<tr>
<td>Control</td>
<td>9.24±0.52</td>
<td>8.92±1.67</td>
</tr>
<tr>
<td>p value*</td>
<td>0.151</td>
<td>0.179</td>
</tr>
</tbody>
</table>

* Wilcoxon test

Source: Primary data, 2014

Table 4. Analysis of calcium level in intervention and control groups before and after interactions

<table>
<thead>
<tr>
<th>Variable</th>
<th>Δ</th>
<th>p value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium (mg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>0.02±1.16</td>
<td>0.169</td>
</tr>
<tr>
<td>Control</td>
<td>0.24±3.21</td>
<td></td>
</tr>
</tbody>
</table>

* Wilcoxon test
Overall Discussion

The calcium is controlled several processes in body’s immune cells, included chemotaxis, adhesion, and secretion of pro and anti-inflammatory cytokines. The calcium level in the blood had affect in phagocytosis process\(^7\). Besides that, the calcium was functioned in bone and tooth formation, catalyzed biological reactions and muscle contraction. The combination of soy and chocolate in form of drinks contained 440 mg/100 grams per day for 30 days had increased calcium intake in pulmonary tuberculosis patients. Based on this study, calcium was increased obviously due to calcium rich food consumption in the intervention group. Meanwhile, the control group also observed increment in calcium level due to treatment and nutritional education.

There was no significant change in calcium levels in both intervention and control group (p=0.169). The soy chocolate drinks were not affected calcium level in blood of pulmonary tuberculosis patients. The study was conducted by Wejse\(^11\) showed there were no increment in vitamin D and calcium level in blood of pulmonary tuberculosis patients. The lower calcium levels increased osteoporosis occurrence risk\(^12\). The pulmonary TB patient experienced low vitamin D caused bone demineralization and resulted in decrement in bone mineral density (BMD). The study conducted by Riancho\(^13\) showed 27% lower in 25-hydroxyvitamin D in pulmonary tuberculosis patients. In addition, antituberculous treatment and vitamin D supplementation had improved clinical result in TB patients\(^14\).

Conclusion

In conclusions, an increase in calcium intakes by both intervention and control group of patients with pulmonary tuberculosis. Meanwhile, calcium level in the intervention group had experienced an increment too. The statistical analysis of comparison in calcium levels before and after intervention in both groups was insignificant (p=0.169). The comparison between calcium intakes before and after intervention in both groups was significant (p=0.000). Thus, treatment with soybean chocolate drinks had no effect on the calcium levels in the patients of pulmonary tuberculosis.

Acknowledgment: The author would like to extend the appreciation to all the participants from Community Centre for Lung Health Makassar city as well as Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Personal Hygiene among University Students in Hasanuddin University Hostel

Rinda Limbong1, Indra Fajarwati Ibnu1, Muh Arsyad Rahman1
1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study is to obtain information on personal hygiene among university students in hostel of Hasanuddin University. The study type was qualitative research with phenomenology approach. The informants were selected by using purposive sampling of students living in university hostel. The number of informants was 16 students and a head of hostel. The data was collected through in-depth interview, observation and documentation. The data was analysed by using content analysis and represented in narrative form. The results found all informants understood the purpose of personal hygiene and have own self-care to maintain health for disease prevention despite some actions deviate from informant’s knowledge level. The lead factors in personal hygiene included availability of facilities and infrastructure and individual factors. The students should maintain personal hygiene and environment for their good health. The coordination between university management and hostel is necessary in improving hostel facilities and infrastructure for students to maintain their personal hygiene.

Keywords: hostel; personal hygiene; qualitative research; university students;

Introduction

The personal hygiene is one of most important way in infection control activities1. An estimation 2.5 billion people had lack of sanitation facilities and living with poor personal hygiene in worldwide2. In global, 5.3% of mortalities and 6.8% of disability due to poor hygiene, sanitation and unhygienic water3. Personal hygiene is practice in body cleanliness maintenance4. The personal hygiene helped in maintain good health. Personal hygiene involved several good habits such as body shower, brushing teeth and washing hand to keep away the bacteria and virus from bodies5. The poor hygiene caused skin disease, diarrhea, dental diseases, worm infestations4,6,7,8.

Poor knowledge, attitude and practice had contributed in lack of personal hygiene. Based on initial in-depth interview, several students found lack of availability of clean water in the hostel. Besides, students also experienced in skin problem and ulcers. Lack of personal hygiene behavior among students due to insufficient of facilities and infrastructure in the university hostel. The aim of this study is to obtain information on personal hygiene among university students in hostel of Hasanuddin University.

Methodology

Study Type: This study was used qualitative research with phenomenology approach. The techniques used were observation and in-depth interviews.

Location and Time: This study was conducted from March 2016 to April, 2016 in Hasanuddin University student’s hostel.

Study Informant: The informants are 16 students and head of hostel by using purposive sampling method.

Data Analysis: The primary data was obtained by in-depth interviews and observation. Meanwhile, secondary data was obtained from university hostel management about number of hostel residents and availability of facilities and infrastructure in Hasanuddin University student hostel.
Result and Discussion

Based on in-depth interviews, the informants understanding about personal hygiene such as body shower, brushing teeth, hand washing, hair washing, foot washing and changing clothes. The purpose of personal hygiene is to maintain health and disease prevention. Besides, personal hygiene purpose is part of religious obligations, comfortable and body care. The informants suggested bath twice and three times per day and take bath to prevent germs and bacteria that caused illness, increase the comfortable and cleanliness. Besides, knowledge of informants about oral and dental hygiene is to avoid toothache, bad breath, feel comfortable and avoid microorganism such as bacteria and germs lead in teeth damage.

The informants suggested washing hand with soap has been done before and after meals and touching dirty objects. Meanwhile, informants mentioned drying clothes under sun exposure so that dry quickly, odorless and protected from germs and bacteria. Based on in-depth interview, some informants claimed bedsheets replaced two to four times per month or changing when felt uncomfortable. Most informants revealed changing clothes after bath. Meanwhile, some informants would change clothes when felt uncomfortable and did not wear repeated clothes. In additions, all informants found lending bath tools to others lead to skin diseases and diarrhea. An informant claimed bath tools are privacy thing and not encouraged to lend to other persons. Based on knowledge on nail hygiene, most informants suggested regular nail cutting had maintained nail hygiene and prevent diseases such as diarrhea and abdominal pain. Besides, informants understood about importance of maintain genital hygiene to prevent infection such as vaginal discharge, itching and odor which affected comfortable. The informants understood water reservoir container need regularly cleaning to prevent skin disease and mosquito larvae lead to dengue fever. Most informants suggested throw daily garbage in the trash. In additions, some informants revealed never lend their bath tools to others. Based on Table 3, there were many facilities and infrastructure need to be improved and needed addition of cleaners for maintaining cleanliness of hostel.

The result found all informants understood personal hygiene purpose is to maintain body health in disease prevention. In additions, personal hygiene is religion obligation. Based on in-depth interview, most informants revealed had bath for two to three times per day and depend on their daily activity. The clothes are drying under sun exposure so that odourless and protected from various germs and bacteria. Meanwhile, informants changed clothes and not wear repeatedly. In University of Sumatera Utara, most of students had good knowledge in changing clothes with twice a day or after bath. Borrowing and lending bath tools also impacted skin diseases such as pruritus, itching and tinea nigra. The bedsheets had changed by two to four times per month. Some informants also suggested bedsheets replaced when bedsheet was dirty. Based on this study, informants had maintained hair and scalp hygiene which lead to uncomfortable.

A study found hair hygiene is an effort to keep hair and scalp hygiene by washing hair at least twice a
week in University of Sumatera Utara\textsuperscript{10}. Nail hygiene was cutting and cleaned caused diseases such as diarrhoea and abdominal pain. The hygiene practices are most influences by individual’s awareness, attitude and knowledge\textsuperscript{11}. The water reservoir containers had cleaned when the containers were dirty and empty. The informants had good actions toward bath habits. The sharing bath tools also lead to skin disease such as itching. In additions, the clothes had changed regularly so that to prevent skin disease. Most informants are hanging clothes in the room without sun exposure. The humid clothes lead to skin disease and odor. Meanwhile, the informants washed hair once to three times per week and regularly washing hand by using soap. The hand is one channel in germs transmission\textsuperscript{12}. In Indonesia, most people using hand to eat, prepare food and work. Therefore, hand and nail need to be clean before and after activities such as meal or after toilet by using soap. The genital hygiene is often overlooked by women. The bad genital hygiene increased humidity caused itching and infection. The female informants suggested sanitary napkins are changed three times per day or every four hours. The oral and dental hygiene is among personal hygiene type. The toothbrush regularly twice per day also improved personal hygiene. Most informants suggested throw their daily garbage in the trash and had rubbish bin in their hostel room. The trash is potentially disease resource transmission through flies, rats, dogs and other animals. Based on observation, bathroom condition is unclean and dirty in university hostel. The water reservoir also experienced damaged or leak. This indicated that the facilities and infrastructure in the hostel is insufficient. Besides, no any staff to handle student room cleanliness.

**Conclusion**

In conclusions, all informants understand of personal hygiene purpose and have own self-care to maintain health for disease prevention. Although, some real actions deviate from informant’s knowledge level, the factor leads in personal hygiene included availability of facilities and infrastructure and individual factors. The students should maintain personal hygiene and environment for their good health. The coordination between university management and hostel in improving hostel facilities and infrastructure for students in maintained their personal hygiene.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


12. Irianto, K. Revealing the world of microorganisms.
Influence of Microskill Learning Model Toward Student’s Psychomotor Learning Outcomes in Birth Delivery care Competence Scale II in Panrita Husada Health Science School, Bulukukuma Regency

Rosnawati1, Budu1, Irfan Idris1
1Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract
Midwife had the roles as main supporter in primary care during pregnancy, birth, and postpartum period and normal newborn during first 28 days of life. The study aims to determine influence of microskill learning model implementation toward students’ psychomotor learning outcomes in second stage of labor care in Panrita Husada Health Science School (STIkes), Bulukukuma regency. The study was used a quantitative approach with quasi experimental designs included non-equivalent control group design. The study was conducted in November to December 2014 in STIkes Panrita Husada, Bulukukuma regency. The study population were all midwifery study in Midwifery Diploma III study program in third semester. The sample sizes were 85 respondents which obtained by systematic random sampling technique. The data was collected using the checklist. The data had analysed by using Friedman test, Wilcoxon test and Mann Whitney test. The statistical test in the influence of microskill learning model toward student’s psychomotor learning outcomes in birth delivery care competence scale II had obtained p=0.000.

Keywords: Conventional learning model; Midwives; Microskill learning model; Psychomotor learning outcome.

Introduction
Midwife had the roles as main supporter in primary care during pregnancy, birth, and postpartum period and normal newborn during first 28 days of life1-3. According to United Nations Population Fund, midwifery involves more than mother care during childbirth, their roles also promotes women-centred care and general well-being through supportive and preventive model of care4. The midwifery is a profession had regulated scope of practice who graduated from an approved program meet necessary of essential competencies of International Confederation of Midwives and practiced in home, community, hospital, clinic or health unit5.

The care during second stage of labor is among main competencies that must have by midwifery students. This competency is targeted to provide high degree of health for mother and infants through integrate effort so that service quality can be maintain at desired or optimal level. The qualified midwives are not only received education in the classroom but also with clinical learning including practical. The learning is generally defined as self-directed, work-based process which increased adaptive capacity6. Meanwhile, Barrett et al. had defined learning is a sensory process which involved combination seeing, hearing and doing7. (Barret et al., 2008). The method used by teachers also influenced the success in teaching and learning process.

Five-step microskills model is learning model which applied in optimization of clinical guidance for laboratory and clinic. The five-step microskills model are get a commitment, probe for supporting evidence, teach general rules, reinforce what was done right and correct mistake8. The study aims to determine the influence of microskill learning model implementation toward students ‘psychomotor learning outcomes in second stage of labor care in STIkes Panrita Husada, Bulukukuma regency.
Methodology

Study design

The study was used a quantitative approach with quasi experimental designs included non-equivalent control group design.

Study location and time

The study was conducted in November to December 2014 in STIkes Panrita Husada, Bulukumba regency.

Study population and sample

The study population were all midwifery study in Midwifery Diploma III study program in third semester. The sample sizes were 85 respondents which obtained by systematic random sampling technique.

Data analysis

The data was collected using the checklist. The data had analysed using Friedman test, Wilcoxon test and Mann Whitney test.

Results and Discussion

Bivariate Analysis

Based on Table 1, 40 respondents had attended class with conventional learning model application. The median on pre-test was 3.6 and increased to 33.3 on post-test I. In post-test II, median was 64.9 and increased to 86.0 in post-test III. Based on Friedman test, there are differences on median during pre-test and post-test based on conventional learning model among midwifery students in STIkes Panrita Husada.

Table 1. The median difference during pre-test and post-test based on conventional learning model among midwifery students in STIkes Panrita Husada, Bulukumba regency

<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>N</th>
<th>Median (minimum- maximum)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>40</td>
<td>3.6 (1.2-10.7)</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test I</td>
<td>40</td>
<td>33.3 (3.6-70.2)</td>
<td></td>
</tr>
<tr>
<td>Post-test II</td>
<td>40</td>
<td>64.9 (13.1-92.9)</td>
<td></td>
</tr>
<tr>
<td>Post-test III</td>
<td>40</td>
<td>86.0 (64.3-100.0)</td>
<td></td>
</tr>
</tbody>
</table>

Based on Wilcoxon analysis found there was significant difference between pre-test and post-test. This result suggested students psychomotor learning outcomes different between pre-test and post-test I, pre-test with post-test II, pre-test with post-test III, post-test I with post-test II, post-test I with post-test III and post-test II with post-test III. The conventional learning model had improved students’ psychomotor learning outcomes in birth delivery care competence scale II.

Table 2. Difference of each measurement on the conventional learning model for midwifery students in STIkES Pnarita Husada, Bulukumba regency

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pre-test</th>
<th>Post-test I</th>
<th>Post-test II</th>
<th>Post-test III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>-</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test I</td>
<td>0.000</td>
<td>-</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test II</td>
<td>0.000</td>
<td>0.000</td>
<td>-</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test III</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-</td>
</tr>
</tbody>
</table>
There were median differences during pre-test and post-test on microskill learning model towards students’ psychomotor learning outcomes. The median on pre-test was 3.6 and increased to 38.1 on post-test I, while median during post-test II was 78.6 and increased to 95.2 in post-test III. Based on Friedman test, there was differences on midwifery students learning outcomes during pre-test and post-test after microskill learning model application.

**Table 3. The median differences during pre-test and post-test based on micro skill learning model toward students’ psychomotor learning outcomes among midwifery students in STIKes Panrita Husada, Bulukumba regency**

<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>N</th>
<th>Median (minimum- maximum)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>44</td>
<td>3.6 (1.2-9.5)</td>
<td></td>
</tr>
<tr>
<td>Post-test I</td>
<td>44</td>
<td>38.1 (17.9-58.3)</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test II</td>
<td>44</td>
<td>78.6 (32.1-92.9)</td>
<td></td>
</tr>
<tr>
<td>Post-test III</td>
<td>44</td>
<td>95.2 (83.3-100.0)</td>
<td></td>
</tr>
</tbody>
</table>

Based on Wilcoxon test, there was differences in students psychomotor learning outcomes between pre-test and post-test. The microskill learning model had improved students’ psychomotor learning outcomes in birth delivery care competence scale II.

**Table 4. Difference of each measurement on the microskill learning model for midwifery students in STIKes Pnarita Husada, Bulukumba regency**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pre-test</th>
<th>Post-test I</th>
<th>Post-test II</th>
<th>Post-test III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>-</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test I</td>
<td>0.000</td>
<td>-</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test II</td>
<td>0.000</td>
<td>0.000</td>
<td>-</td>
<td>0.000</td>
</tr>
<tr>
<td>Post-test III</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>-</td>
</tr>
</tbody>
</table>

Based on Table 5, there was no differences in the median between microskill learning model and conventional learning model since both groups had same median, 3.6. In post-test I, median in microskill learning model is higher than median in conventional learning model and there was no significant median differences between students’ psychomotor learning outcomes with microskill learning model and students’ psychomotor learning outcomes with conventional learning model, p=0.447>0.05. Meanwhile, there was median differences in students’ psychomotor learning outcomes with microskill learning model and students’ psychomotor learning outcomes with conventional learning model during post-test II and post-test III. The median in microskill learning model is 78.6 which higher than conventional learning model, 64.9 in post-test II. Besides, the median in microskill learning model is 95.2 which also higher than median for conventional learning model, 86.3 on post-test III.
Table 5. The differences on influence of microskill learning model and conventional learning model toward students’ psychomotor learning outcomes among midwifery students in STIKes Panrita Husada, Bulukumba regency

<table>
<thead>
<tr>
<th>Learning model</th>
<th>Median (minimum-maximum)</th>
<th>Pre-test</th>
<th>Post-test I</th>
<th>Post-test II</th>
<th>Post-test III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microskill learning model (intervention group)</td>
<td>3.6 (1.2-9.5)</td>
<td>38.1(17.9-58.3)</td>
<td>78.6 (32.1-92.9)</td>
<td>95.2 (83.3-100)</td>
<td></td>
</tr>
<tr>
<td>Conventional learning model (control group)</td>
<td>3.6 (1.2-10.7)</td>
<td>33.3 (3.6-70.2)</td>
<td>64.9 (13.1-92.9)</td>
<td>86.3 (64.3-100)</td>
<td></td>
</tr>
<tr>
<td>p value</td>
<td></td>
<td>0.440</td>
<td>0.447</td>
<td>0.001</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Based on Figure 1, there was rapid increment of median in microskill learning model than conventional learning model. The median was 3.6 in the pre-test for both models and microskill learning model was observed an increment to 38.1 and 33.3 for conventional learning model on post-test I. In post-test II, median for microskill learning was increased to 78.6 while 64.9 for conventional learning model. The median for microskill learning model was increased to 95.2 and conventional learning model was increased to 86.

![Figure 1. Median difference between pre-test and post-test III for students ‘psychomotor learning outcomes](image)

**Overall Discussion**

The result found median differences of students ‘psychomotor learning outcomes with conventional learning model and microskill learning model for pre-test and post-test. The median differences on each measurement indicated conventional learning model had increased students ‘psychomotor learning outcomes. The midwifery students learned or gained new information based on the learning material, hence improve students ‘psychomotor learning outcomes. Meanwhile, statistical test showed there was significant median differences between microskill learning model and conventional learning model toward students ‘psychomotor learning outcomes on post-test II and post-test III. The microskill learning method was introduced in clinical learning either in classroom nor practical. The microskill learning model is easy to learn and apply to guide midwifery in their practical so that their competencies are achieved. The five-step microskill steps helped to improve effectiveness for teacher and midwifery students’ communication. Ahern et al. mentioned interaction between teacher, colleagues and students helped in development of students’ professional value systems. The effectiveness in the microskill learning model implementation also strongly influenced by teacher’s
capabilities in their learning fundamental, build good communication with students, recognized student’s characteristic to create good relationship and provide solutions for students in order to improve their study performance. Besides, Thompson et al. had suggested effective midwifery education also needed teachers who had caring, competent and compassionate values. Midwifery teachers should be preparing systematic and organised steps based on the guideline to evaluate students ‘psychomotor behaviour. Thus, any learning method or model lead in poor student achievement, teachers are encouraging to change or combine methods to create more effective learning method or model.

Acknowledgement: The author would like to thank to STIKes Panrita Husada, Bulukumba regency for resources and data input and Faculty of Medicine, Hasanuddin University for unconditionally support.

Conclusion

In conclusions, there was significant difference in students’ psychomotor learning outcomes based on conventional learning model and microskill learning outcomes during pre-test and post-test (p=0.000). There were significant differences on students’ psychomotor learning outcomes on microskill learning model with conventional learning model on post-test II (p=0.001) and post-test III (p=0.000).

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

3. doi:10.3912/OJIN.Vol19No02Mana04
Determinant Factor in Implementation of Early Initiation of Breastfeeding at Sentani Community Health Center Jayapura District

Rusmina Nasendi1, Masni1, Noer Bahry Noor1
1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

Breastfeedings will always remain as the common way of providing babies with all the required nutrients in order to have healthy development and growth. In general, all mothers are able to breastfeed provided they get the full support from the family and society in addition to accurate information. The aim of this study is to determine the overall influence of knowledge, attitude, education level, and maternal parity in practicing of early initiation of breastfeeding at Sentani community health centre (Puskesmas), Jayapura district. The study was used observational research used cross sectional design. The study employed 36 respondents as sample selected used completely by random sampling. The data were obtained through observational checklist and questionnaire. The data were analyzed by means of univariate as well as bivariate used chi-quadrant test. The result found significant relationship between maternal knowledge and early initiation of breastfeeding implementation at Sentani Puskesmas, Jayapura district. Besides, study also found no significant relationship between attitude, education level and maternal parity in implementation of early initiation of breastfeeding.

Keywords: Attitudes; early initiation of breastfeeding; level education; parity.

Introduction

The breastfeeding is among ideal food process for infants in development and health grow1. The breastfeeding has many benefits such as reduced morbidity and mortality in childhood2,3. Based on United Nations Children’s Fund (UNICEF) and World Health Organization (WHO), mother had suggested given exclusive breastfeeding to baby up to 6 months until 24 months or beyond4. The inappropriate food feed practices led obesity and health problem in children5. The initial breastfeeding within first hour of infant life helped reduce death risk in first month for 20%6.

The initial breastfeeding help infant to get first breast milk that contain high antibodies and nutritious that protected infant from diseases7. In additions, initial breastfeeding also help mother in reduced postpartum hemorrhage8,9. The early initiation of breastfeeding improved emotional bonding between mother and infant. The prelacteal feeding had bad impact toward breastfeeding and initiation breastfeeding had reduced the foundation of optimal breastfeeding9. The exclusive breastfeeding had high potential in decreased under-five mortality about 11.6%10. Although, only 40% infants aged 6 months or less that were in exclusive breastfeeding11. Meanwhile, low percentage is observed in South Asia for early initiation of breastfeeding ranged from 45% to 72.7% in Nepal, 36.4% in India and 83.3% in Sri Lanka8. In Thailand, the prevalence of exclusive breastfeeding about 2.4% in 200611. Meanwhile, some population groups less likely to initiate breastfeeding compared to Australian mothers in South Western Sydney, Australia13. The percentage of early breastfeeding in Indonesia was still low. The early initiation of breastfeeding in Indonesia was 49.3% and lower in some provinces between 2007 and 201214.

The socioeconomic factors had influenced in early initiation of breastfeeding were maternal age, education level, birth health facility, parity, and family income15,16. In Northeastern Ethiopia, mothers who lived in urban
places, experienced caesarean section, education level, and birth order of index child are involved in early initiation of breastfeeding. In India, education level, economic status, place of birth, prenatal visits to health care facilities, mother’s tribe, assistance during childbirth and partner’s violent behavior had influenced early initiation of breastfeeding. A study in South Sulawesi found education level, lack in knowledge, and support from family and midwife were most influenced factors in early initiation breastfeeding implementation. A few studies had reported factors associated with early initiation of breastfeeding in Indonesia. The aim for this study was determined influence of knowledge, attitude, education level, and maternal parity in the practice of early initiation of breastfeeding at Sentani Puskesmas Jayaputra district.

Methodology

Study Type

The study was used analytic observational research with cross sectional study approach. The data collecting done simultaneously with correlated with education, knowledge and attitude of midwife in breastfeeding initiative management at Sentani Puskesmas of Jayapura district.

Location and Time

The study was conducted in Puskesmas Sentani, Jayapura regency for one-month period.

Population and sample

The population were all mothers who gave birth in Puskesmas Sentani, Jayaputra regency within study period. The study employed 36 respondents as the sample selected used completely random sampling.

Data Collection

The primary data was obtained through questionnaire and observational checklist. The secondary data was obtained from Puskesmas Jayaputra regency related to midwife’s behavior in early breastfeeding initiation.

Data Analysis

The univariate analysis was presented in form of frequency distribution such as characteristic respondent. The bivariate analysis was presented in form of cross-tabulation analysis to observe relationship between independent variables with dependent variable using chi-square test.

Result and Discussion

Univariate Analysis

Table 1 showed frequency distribution by majority respondents was aged from 20 years old until 24 years old with number of 14 respondents (38.9%) and only 1 respondent (2.8%) that aged below 20 years old. There were 2 respondents (5.56%) had Bachelor degree and 6 respondents (16.67%) completed junior high school. Besides, 34 respondents had only child or two children and only 1 respondent (5.56%) had 3 children until 5 children.

Table 1. Frequency distribution of characteristic respondent based on age, education level, and maternal parity in Sentani Puskesmas Jayaputra district

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age (years old)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>20-24</td>
<td>14</td>
<td>38.9</td>
</tr>
<tr>
<td>25-29</td>
<td>10</td>
<td>27.8</td>
</tr>
<tr>
<td>30-34</td>
<td>8</td>
<td>22.2</td>
</tr>
<tr>
<td>35-39</td>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>36</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior High school</td>
<td>6</td>
<td>16.67</td>
</tr>
<tr>
<td>Senior High School</td>
<td>28</td>
<td>77.77</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>2</td>
<td>5.56</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>36</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Family size (children)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-2</td>
<td>34</td>
<td>94.44</td>
</tr>
<tr>
<td>3-5</td>
<td>2</td>
<td>5.56</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>36</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Bivariate Analysis

Based on Table 2, there were 26 respondents (81.2%) had good knowledge compared 1 respondent (25.0%) had less knowledge. There was significant relationship between maternal knowledge and early
initiation of breastfeeding implementation. Based on Table 3, 22 respondents (78.6%) had good attitude compared mother with poor attitude (62.5%). Besides, no significant relationship between maternal attitude and early initiation of breastfeeding implementation (p=0.310>0.05). There were 22 respondents (73.3%) had high education level and 5 respondents (83.3%) with low education level with good early initiation of breastfeeding implementation. Based on statistical test indicated no significant relationship between education level with early initiation of breastfeeding implementation as shown in Table 4.

Table 2. Relationship between maternal knowledge and early initiation of breastfeeding implementation in Sentani Puskesmas Jayaputra District

<table>
<thead>
<tr>
<th>Maternal Knowledge</th>
<th>Early initiation of breastfeeding implementation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Good</td>
<td>26</td>
<td>6</td>
</tr>
<tr>
<td>Poor</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 3. Relationship between maternal attitude and early initiation of breastfeeding implementation in Sentani Puskesmas Jayaputra District

<table>
<thead>
<tr>
<th>Maternal Attitude</th>
<th>Early initiation of breastfeeding implementation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Good</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>Poor</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 4. Relationship between maternal education level and early initiation of breastfeeding implementation in Sentani Puskesmas Jayaputra District

<table>
<thead>
<tr>
<th>Maternal education level</th>
<th>Early initiation of breastfeeding implementation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>High</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>Low</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>27</td>
<td>9</td>
</tr>
</tbody>
</table>

There were 26 respondents (74.3%) had low parity with early initiation of breastfeeding implementation. Besides, 1 respondent had high parity with good early initiation of breastfeeding implementation. Based on statistical test showed no significant relationship between maternal parity with early initiation of breastfeeding implementation as shown in Table 5.
### Table 5. Relationship between maternal parity and early initiation of breastfeeding implementation in Sentani Puskesmas Jayaputra district

<table>
<thead>
<tr>
<th>Maternal Parity</th>
<th>Early initiation of breastfeeding implementation</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good (%)</td>
<td>Poor (%)</td>
</tr>
<tr>
<td>Low</td>
<td>26 74.3</td>
<td>9 25.7</td>
</tr>
<tr>
<td>High</td>
<td>1 100.0</td>
<td>0 0</td>
</tr>
<tr>
<td>Total</td>
<td>27 75.0</td>
<td>9 25.0</td>
</tr>
</tbody>
</table>

### Overall Discussion

Most of respondents were aged 20 years old until 24 years old in Jayapura inpatient health center. Meanwhile, highest maternal education level among respondents was senior high school level. Based on respondent age of first childbirth, these young mothers were not in high-risk age. Based on respondent’s age and education level, the respondents received new knowledge and easily accessed information. The accessibility of technology and program were accepted and implemented as in early initiation of breastfeeding implementation.

The knowledge is important in early initiation of breastfeeding implementation. The sufficient knowledge helped newly mother had confidence in provided breastfeeding to the baby. In this study, mother with good knowledge had implemented good early initiation of breastfeeding. The easily accessed information and high education level had supported mother in implemented early initiation of breastfeeding. Besides, respondents had experienced previous pregnant also helped in early initiation of breastfeeding implementation. Early initiation of breastfeeding implementation failure was due to lack of maternal knowledge, attitude, family and labor support, health facilities and government policies. In this study, the maternal knowledge was important factor influenced involvement in early initiation of breastfeeding implementation.

There was no significant between maternal attitude and early initiation of breastfeeding implementation. The respondents had good attitude toward early initiation of breastfeeding implementation. The maternal knowledge and attitude influenced mother’s action in early initiation of breastfeeding implementation. The good maternal knowledge and attitude increased awareness in early initiation of breastfeeding implementation and vice versa.

The maternal education level had been sufficient to understand early initiation of breastfeeding implementation. The study suggested maternal education level had influenced early initiation of breastfeeding. However, no significant relationship between maternal education level and early initiation of breastfeeding implementation. Besides, health worker role also influenced in early initiation of breastfeeding. The health worker had provided information to pregnant women so that ease early initiation of breastfeeding implementation.

In additions, the study showed no significant relationship between maternal parity and early initiation of breastfeeding implementation. The respondents had primigravida experience and implemented early initiation of breastfeeding. Besides, respondents had experienced previous pregnant also helped in early initiation of breastfeeding implementation. Early initiation of breastfeeding implementation failure was due to lack of maternal knowledge, attitude, family and labor support, health facilities and government policies. In this study, the maternal knowledge was important factor influenced involvement in early initiation of breastfeeding implementation.

In conclusion, there was a significant relationship between maternal knowledge and early initiation of breastfeeding implementation at Sentani Puskesmas, Jayapura District. Meanwhile, no significant relationship between attitude, education level and maternal parity in
the implementation of early initiation of breastfeeding.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Implementation of First Level Outpatient Reference of BPJS Health Insurance Participants at Community Health Centres in Maros Regency

Septianus Bunga1, Indar1, Ariffin Seweng1

1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

This study aims to analyze implementation of first-level outpatients reference of social insurance administration organization (BPJS) health insurance participant at community health centers (Puskesmas) in Maros regency. This study was conducted in descriptive research type at two Puskesmas included Puskesmas Mandai and Puskesmas Turikale. The data was collected by interviews, observations and document study. The data were analyzed qualitatively and supported by quantitative data. The result showed implementation was good in term of human resources. Besides, there was good understanding among doctors about capitation system and medical indication as well as non-medical needs. However, there were lacking medical equipment facilities included medical equipment for single use (BMHP) and availability of drugs. Most of references from Puskesmas Mandai are for hypertension and diabetes mellitus while hypertension, rheumatism and diabetes mellitus for Puskesmas Turikale. The patients usually initiated for outpatient references without any medical indication due to patients already admitted in hospital. Other reasons included requested from doctor in the hospital, preference to have treatment from medical specialist and limitation of drugs, BMHP and medical equipment.

Keywords: analysis; BPJS health insurance; community health; first-level outpatient references.

Introduction

The health equity and population health is among main target of World Health Organization1. Based on WHO, every human has right to the highest attainable standard of health without discrimination2. The health development is organized on humanity basis, empowerment and independence, justice and equity, included priority and benefits with special attention to vulnerable populations including mothers, infants, children, elder and poor families3. Health development aim to raise awareness, willingness and ability to a healthy live for every human so that highest degree of improvement can be realistic.

Indonesia is fourth most population in world after People’s Republic of China, India and United States of America4. In 2010, an estimation of Indonesia population was 237, 641, 326. Indonesia had established BPJS for health and manpower. The participant for this program included all Indonesian citizen and foreigners who worked in Indonesia at least 6 months and paid health insurance fees. Before BPJS implementation in 2011, Indonesia population who joined in health insurance by 76.4 million (63%) and targeted 86 million people are covered insurance in early 2014.

Maros district has a BJPJS health office included 14 Puskesmas with total of 203,529 health BPJS participants. In Acheh, 30%-75% of first level outpatients references were obtained based on own or families request in three Puskesmas in Acheh5. The main reason was patients disappointed on Puskesmas management and preferred treatment in hospital.

Meanwhile, many references based on non-medical indications and poor hospital management affected reference numbers6. A study found poor of understanding on references system, hospital management and availability of health facilities lead to system weakness...
This study aims to analyze implementation of first-level outpatient reference of BPJS health insurance participants at community health centers in Maros regency.

Methodology

Study Type

The study type was descriptive research using qualitative methods. The information was obtained through snowball sampling, collecting techniques with triangulation, qualitative/inductive data analysis and qualitative research.

Location and Time

This study was conducted in February to May 2016 at Puskesmas of Maros regency included Puskesmas Mandai(represented Puskesmas inpatients) and Puskesmas Turikele (represented non-hospitalized health centers).

Study Informants

The informants in this study were selected by snowball sampling technique. The key informants were head of BPJS health in Maros regency and other informants were two main head of Puskesmas, 4 health workers in Puskesmas (2 health workers were represented for each Puskesmas) and 6 reference participants of BPJS Health (3 reference participants per Puskesmas).

Data Collection

The primary data was obtained through in-depth interview on informants, while secondary data was obtained through document review in study location.

Data Analysis

The in-depth interviews were analyzed using content analysis method and triangulation of informants for data validity. The data processing and analysis included collecting data which obtained from in-depth interview and sources, categorized data followed same characteristics or patterns according to data collection method, comparing variables with theory or other study results and presented data in matrix qualitative form.

Result and Discussion

The number of human resources available at Puskesmas in Maros regency is shown in Table 1. In 2016, Mandai Puskesmas have 24,327 participants and Turikele Puskesmas have 22,865 participants of BPJS Health. Based on document review, both Puskesmas had met standard of health workers. The health workers in Puskesmas are sufficient so no interruption in providing service to the patients. The sufficient of health worker headcounts were fulfilled public health in a comprehensive and quality way. Based on interview result, doctors in first level public healthcare facility understood about capitation system used by BPJS Health, even though only in outline. Based on Regulation of Ministry of Health No. 69 in year 2013, health service tariff rates at first level and advanced healthcare facilities in health insurance program implementation setting capitation for Puskesmas ranged between Rp. 3,000 and Rp. 6,000. The capitation funds provided by BPJS Health and paid based on number of registered participants and doctors. Puskesmas Mandai and Turikale gained Rp. 6000 per registered participants.

Table 1. Total of health staff in Mandai and Turikale Puskesmas in 2015

<table>
<thead>
<tr>
<th>Human Resource Type</th>
<th>Number of collapse</th>
<th>Mandai Puskesmas</th>
<th>Turikale Puskesmas</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Doctor</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Dentist</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nurse</td>
<td>11</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Dentist</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Midwife</td>
<td>6</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Nutritionists</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Pharmaceutical Technician</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Health Analyst</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sanitarian</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Health worker</td>
<td>1</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Community</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Epidemiologists</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Supporter</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>74</td>
<td>56</td>
</tr>
</tbody>
</table>
Based on this study, most of doctors in first level public healthcare facility of Puskesmas Mandai and Turikale understood there are 155 diagnosis diseases and given some understanding to patients on references to the hospital. Besides, doctors also need competition standard according Regulations of the Health Minister (Permenkes) year 2014 about clinical practice guidelines in primary health care facilities. The lack of medical equipment facilities in first level healthcare facility caused service interruption to the patients and increased reference numbers to the hospital. The lack in drug supplies in Puskesmas may interfere health service to the patients thus increasing number of first level outpatients to the hospital.

The informants stated that most referred diseases among first level outpatients were diabetes mellitus, rheumatism, hypertension, gastrointestinal diseases and upper respiratory tract infections. The reference diseases from first level public healthcare facility to hospital should refer to 155 diagnosis diseases issued by BPJS Health. The reasons from first level outpatients to be references included patients already admitted in hospital, requested from doctor at the hospital, lack of medicines, BMHP, medical equipment facilities and preference to have treatment from specialist doctor. The patients have right to be outpatient references on getting health service at the hospital if Puskesmas have limitation of health facilities and drug.

**Overall Discussion**

Based on this study, availability of human resources at Puskesmas Mandai and Turikale is sufficient for health services. The human resource is very important in health service quality formation. The health insurance development for community is very necessary. Therefore, human resource in health service implementation should be sufficient and distributed throughout community. Furthermore, sufficient of human resources also help in maximize health service capability. Hence, human resource quantity and quality need to be standard requirement in providing health services quality to reduce reference number not met BPJS Health requirement.

Besides, informants understood about capitation system applied by BPJS Health and service fund was allocated had increased from 60% to at least 75%. Nevertheless, the informants still satisfied with this system since no influence on their work. A study conducted in Puskesmas Ambon found health worker performance is depend on incentives or special compensation. This incentive had increased health worker motivation and productivity on providing good health service to the patients. The capitation rate for Puskesmas was in range between Rp. 3,000 and Rp. 6,000 per registered participant. Besides, both Puskesmas received varied fund due to several factors such as uncertainty in participant numbers per month. This fund payment variation affected on Puskesmas annual budget plan.

In additions, medical and non-medical indication based on health worker’s knowledge level on clinical condition. The patients with severe disease conditions would referred to hospital due to lack of health facilities. However, patients had referred to hospital even though not in medical indications. The limitation of medical equipment facilities was found on both of Puskesmas and health workers need to spend their own money on purchasing some of BMHP. Therefore, government need to give attention on improve healthcare facilities and standardized tools in Puskesmas. The availability of medical equipment facility affected on references system implementation. Besides, sufficient medical equipment in Puskesmas also increased health worker performance and productivity. Furthermore, limitation of drug also occurred in both Puskesmas. This problem leads to patients had referred to the hospital. The informants had suggested improvement in drug availability in reducing reference numbers and provided good health service quality among patients.

Based on in-depth interview, Puskesmas have own guideline on the reference diseases included 155 diagnosis diseases. Puskesmas Mandai and Turikale have references system implementation but limitation of drug and medical equipment facilities need patients refer to hospital for further treatment. The result had found most of diseases were referred included upper respiratory infections, hypertension, diabetes mellitus, rheumatism. The first level outpatients requested references at Puskesmas Mandai and Turikale due to several factors such as limitation of drug and medical equipment facilities, preference to have treatment with specialist doctor, no and advised by doctor for referring to hospital. The patients had lack of confidence in Puskesmas health services and medicines ineffectiveness lead to have treatment in advance health centers such as
the hospital.

**Conclusion**

In conclusions, human resources in both Puskesmas was in sufficient and doctors had good understanding on capitation system and medical and non-medical indications. Besides, there are still lacking in health equipment facilities and medicine supplies. Most type of reference diseases in both of Puskesmas such as hypertension and diabetes mellitus which are chronic diseases required long and continually treatment. The patient reasons on requesting references included limitation of medical equipment facilities and drug, advised from doctors at the hospital and preference to have treatment with specialist doctor. The Maros Health Office need to improve health facilities and infrastructure as well as drug availability at Puskesmas in order to reduce reference numbers to advance health centers.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


4. Indonesia S. National Population and Family Planning Board (BKKBN), and Ministry of Health (Ministry of Health — MOH), and ICF International. 2012.


7. Ali FA. Analysis of First Level Outpatient Referral Implementation for Participants in the National Health Insurance Program (JKN) at Siko Health Center and Kalumata Health Center in Ternate Year 2014. JIKMU. 2015;5(3).


Influence of Oxytocin Massage toward Oxytocin Concentration Changes among Mothers in Siti Khadijah I Maternity Hospital, Makassar

St. Subriani¹, Nasrudin A. M¹, Irfan Idris¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

The study aimed to determine influence of oxytocin massage toward oxytocin concentration changes among mothers in Maternity Hospital of Siti Khadijah I, Makassar. The study used a quasi-experimental research design to determine influence of oxytocin massage (independence variable) toward oxytocin concentration changes (dependence variable) among mothers. The study was conducted from March 2016 to May 2016 at Maternity Hospital of Siti Khadijah I, Makassar. The study population were primipara mothers at Maternity Hospital of Siti Khadijah I, Makassar. The sample sizes were 60 respondents (30 respondents were in control group and 30 respondents were in intervention group). The samples were obtained by using purposive sampling techniques. The univariate analysis is represented in the frequency distribution for respondent characteristics. The bivariate analysis had used Mann Whitney U test to compare the oxytocin concentration changes among mothers who had received oxytocin massage and without oxytocin massage. The statistical test in the oxytocin concentration among others with oxytocin massage and mothers without oxytocin massage was p=0.175 in the latent phase and active phase (p=0.602).

Keywords: Active phase; Latent phase; Oxytocin hormone; Postpartum mothers

Introduction

The postpartum period also known as puerperium is completed six weeks after childbirth where mother, baby and family need to adapt to the new situations. The postpartum period had divided into three periods: immediate (1st to 10th day), late (11th to 45th days) and remote (from 45th days onward). Romano et al. stated postpartum period had three distinct but continuous phases included initial or acute period which involves first 6-12 hours of postpartum, second phase known as subacute postpartum period lasts between 2 weeks and 6 weeks and third phase is delayed postpartum period which last up to 6 months. The postpartum period also known as period that susceptibility to emotional disorders especially postpartum depression. Postpartum depression (PPD) is common which developed in women within 1st year after childbirth. Lower oxytocin levels in pregnancy is among factor lead in impaired emotional adaptation in mothers which caused PPD development and affected maternal behaviour quality. The oxytocin levels are higher in pregnant and postpartum women than non-pregnant women. Oxytocin is released into circulating blood and brain structure during breastfeeding and skin-to-skin contact in mother and infant. The oxytocin massage is spinal massage from fifth or sixth costa until scalpula which stimulated parasympathetic nerves so that prolactin and oxytocin hormone are released. The study aimed to determine influence of oxytocin massage toward oxytocin concentration changes among mothers in Maternity Hospital of Siti Khadijah I, Makassar.

Methodology

Study design

The study was used a quasi-experimental research design to determine influence of oxytocin massage (independence variable) toward oxytocin concentration changes (dependence variable) among mothers.
**Study location and time**

The study was conducted from March 2016 to May 2016 at Maternity Hospital of Siti Khadijah I, Makassar.

**Study population and sample**

The study population were postpartum primipara at Maternity Hospital of Siti Khadijah I, Makassar. The sample sizes were 60 respondents (30 respondents were in control group and 30 respondents were in intervention group) which met the study criteria included postpartum primipara mothers, willing to be respondents, mothers who had oxytocin massage and never had oxytocin massage and good in mental health. The samples were obtained by using purposive sampling techniques.

**Data analysis**

The univariate analysis is represented in the frequency distribution for respondent characteristics. The bivariate analysis had used Mann Whitney U test to compare the oxytocin concentration changes among mothers who had received oxytocin massage and without oxytocin Massage.

**Results And Discussion**

**Univariate analysis**

Most of respondents were aged between 26 years and 30 years. The least of respondents were aged more than 35 years which were only 3 respondents (9.4%). Meanwhile, 26 respondents (81.3%) had low education and 6 respondents (18.8%) had high education. Majority of respondents (87.5%) were housewife and only 4 respondents (12.5%) were civil servant. Besides, 22 respondents (68.3%) had uterine contractions between 20 seconds and 40 seconds and only 2 respondents (6.3%) had uterine contractions below 20 seconds. Meanwhile, half of respondents (50%) were latent phase and half respondents (50%) were in active phase.

**Table 1. Respondent characteristic based on postpartum mother status in Maternity Hospital of Siti Khadijah I, Makassar**

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Latent phase</th>
<th>Active phase</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>25.0</td>
</tr>
<tr>
<td>26-30</td>
<td>6</td>
<td>8</td>
<td>14</td>
<td>43.8</td>
</tr>
<tr>
<td>31-35</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>21.9</td>
</tr>
<tr>
<td>&gt;35</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>12</td>
<td>14</td>
<td>26</td>
<td>81.3</td>
</tr>
<tr>
<td>High</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>18.8</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>15</td>
<td>13</td>
<td>28</td>
<td>87.5</td>
</tr>
<tr>
<td>Civil servant</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>Uterine contraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20 seconds</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>20-40 seconds</td>
<td>16</td>
<td>6</td>
<td>22</td>
<td>68.3</td>
</tr>
<tr>
<td>&gt; 40 seconds</td>
<td>0</td>
<td>8</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Postpartum phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latent phase</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td>50</td>
</tr>
<tr>
<td>Active phase</td>
<td>8</td>
<td>8</td>
<td>16</td>
<td>50</td>
</tr>
</tbody>
</table>
Based on Table 2, there were 8 respondents (25%) which had oxytocin massage on latent phase and active phase. Most of respondents had oxytocin hormone on latent phase between 350.1 and 400, 9 respondents (56.3%) and only 1 respondent had oxytocin hormone more than 450. Meanwhile, most respondents had oxytocin hormone less than 350 on their active phase, 6 respondents (37.5%) and 4 respondents (25.0%) had oxytocin hormone between 350.1 and 400.

Table 2. Frequency of each variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxytocin massage during latent phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Oxytocin massage during active phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Oxytocin hormone during latent phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;350</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>350.1-400</td>
<td>9</td>
<td>56.3</td>
</tr>
<tr>
<td>400.1-450</td>
<td>4</td>
<td>25.0</td>
</tr>
<tr>
<td>&gt;450</td>
<td>1</td>
<td>6.3</td>
</tr>
<tr>
<td>Oxytocin hormone during active phase</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;350</td>
<td>6</td>
<td>37.5</td>
</tr>
<tr>
<td>350.1-400</td>
<td>4</td>
<td>25.0</td>
</tr>
<tr>
<td>400.1-450</td>
<td>3</td>
<td>18.8</td>
</tr>
<tr>
<td>&gt;450</td>
<td>3</td>
<td>18.8</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Bivariate analysis

The mean of oxytocin hormone on latent phase for postpartum mother with oxytocin massage were 362.1440 and without oxytocin massage were 350.3560. Meanwhile, the standard deviation of oxytocin hormone for postpartum mother with oxytocin massage was 18.8961 and without oxytocin massage was 7.9194. The minimum and maximum value of oxytocin hormone for postpartum mother with oxytocin massage were 343.2479 and 342.4366, while postpartum mother without oxytocin massage had minimum and maximum value of 342.4366 and 358.2754. Based on Mann Whitney test, there was no significant relationship between oxytocin concentration changes in mothers with oxytocin massage and mothers without oxytocin massage on latent phase.

Table 3. Analysis of mean differences of oxytocin concentration changes on latent phase between mothers had oxytocin massage and without oxytocin massage

<table>
<thead>
<tr>
<th>Oxytocin massage</th>
<th>Oxytocin hormone</th>
<th>p value (Mann Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Yes</td>
<td>362.1440</td>
<td>18.8961</td>
</tr>
<tr>
<td>No</td>
<td>350.3560</td>
<td>7.9194</td>
</tr>
</tbody>
</table>
Meanwhile, mean of oxytocin hormone for mothers with oxytocin massage was 337.7880, while mothers without oxytocin massage had mean of oxytocin hormone by 350.3520. The standard deviation of oxytocin hormone for mothers with oxytocin massage was 22.6834 and mothers without oxytocin massage had standard deviation of 64.8219. Furthermore, minimum and maximum of oxytocin hormone for mothers with oxytocin massage were 315.1046 and 360.4714. The statistical test found no significant influence between oxytocin concentration changes in mothers with oxytocin massage and mothers without oxytocin massage on active phase.

Table 4. Analysis of mean differences of oxytocin concentration changes on active phase between mothers had oxytocin massage and without oxytocin massage

<table>
<thead>
<tr>
<th>Oxytocin massage</th>
<th>Oxytocin hormone</th>
<th>p value (Mann Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Yes</td>
<td>337.7880</td>
<td>22.6834</td>
</tr>
<tr>
<td>No</td>
<td>350.3520</td>
<td>64.8219</td>
</tr>
</tbody>
</table>

The mean of oxytocin concentration for mothers on latent phase was 362.1440 and 337.7880 for mothers in the active phase with oxytocin massage. Meanwhile, the standard deviation in oxytocin concentration among mothers on latent phase was 18.8961 and 22.6834 among mothers on active phase with oxytocin. The Mann Whitney test showed no significant relationship between mean difference in oxytocin concentration changes between latent phase and active phase among mothers with oxytocin.

Table 5. Analysis of mean difference in oxytocin concentration changes between latent phase and active phase among mothers with oxytocin massage at Maternity Hospital of Siti Khadijah I, Makassar

<table>
<thead>
<tr>
<th>Oxytocin massage</th>
<th>Oxytocin concentration</th>
<th>p value (Mann Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Latent</td>
<td>362.1440</td>
<td>18.8961</td>
</tr>
<tr>
<td>Active</td>
<td>337.7880</td>
<td>22.6834</td>
</tr>
</tbody>
</table>

Based on Table 6, the mean of oxytocin concentration on latent phase were 350.3560 and active phase were 350.3520 for mothers without oxytocin massage. The standard deviation of oxytocin concentration on latent phase were 7.9194 and active phase were 64.8219 for mothers without oxytocin massage. The minimum and maximum value of oxytocin concentration on latent phase were 342.4366 and 358.2754, while on active phase were 285.5301 and 415.1739. The statistical test found no significant influence in oxytocin concentration between latent phase and active phase among mothers without oxytocin massage.

Table 6. Analysis of mean difference in oxytocin concentration changes between latent phase and active phase among mothers without oxytocin massage at Maternity Hospital of Siti Khadijah I, Makassar

<table>
<thead>
<tr>
<th>First stage of labour</th>
<th>Oxytocin hormone</th>
<th>p value (Mann Whitney)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Latent</td>
<td>350.3560</td>
<td>7.9194</td>
</tr>
<tr>
<td>Active</td>
<td>350.3520</td>
<td>64.8219</td>
</tr>
</tbody>
</table>
Overall Discussion

The results showed most respondents aged between 26 years to 30 years which are primigravida mothers had no experience and knowledge in the pregnancy and childbirth. Besides, 26 respondents (81.3%) had low education levels and only 6 respondents (18.8%) had high education level. The education is important for better understanding on health information from difference sources and helped in their decision-making in reproductive issue and medical care utilization due to their awareness in health conditions. Based on Mann Whitney test found no significant relationship between oxytocin concentration changes in mothers with oxytocin massage and mothers without oxytocin massage on latent phase and active phase. The latent phase of labour is time in body changes occurring in preparation for actual labour with cervix contraction between 3 and 5 cm dilated. The higher oxytocin levels on latent phase on mothers who received oxytocin massage. Meanwhile, mean of oxytocin levels had observed higher among mothers without oxytocin massage on active phase. Hence, oxytocin levels in mothers were not influenced by oxytocin massage since mothers without oxytocin massage also had high oxytocin level. Many studies on oxytocin levels during labour and postpartum period. A study found oxytocin levels slowly increase until childbirth and decreased up to 8 weeks postpartum period. Fuchs et al. mentioned oxytocin levels receptors increased in myometrium of pregnant women and maximum in early labour. The oxytocin had affected on the uterine muscles and triggered by cervical stimulation (Prevost et al., 2014). In Semarang Hospital, oxytocin massage had increased prolactin hormone levels and breastmilk production among post caesarean section. The oxytocin levels in increase uterine contraction and helped in prevent PPD among mothers.

Acknowledgement: The author would like to thank to all respondents Maternity Hospital of Siti Khadijah I, Makassar for resources and data input as well as Faculty of Medicine, Hasanuddin University for unconditionally support.

Conclusion

In conclusions, oxytocin massage increased oxytocin concentration although not significant influence in latent phase for mothers who received oxytocin massage and without oxytocin massage, while no significant influence between mothers who received oxytocin massage and without oxytocin massage in the active phase.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

9. Dyna, N, Onny S, Sumarni, S, Supriyana, S, Maharani, Y. Oxytocin massage as an alternative in increasing prolactin hormone level and lactation process on post-sectio caesarean women. 4th Asian


Factors Associated with Medical Treatment Compliance among Leprosy Patients in Gowa District 2015-2016

Sucitra Erviana Hajid¹, Rismayanti Akhbar¹, Jumriani Ansar¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

Leprosy disease is a controllable if early diagnosis and treatments are undertaken by the patients. Nonetheless, a significant number of patients become irregular and default the treatments due to a number of personal, psychosocial, economic, medical and health service factors. Up to date, there has no one time cure for this disease without undergoing a continuous treatment. Hence, this study aimed to determine factors associated with medical treatment compliance among leprosy patients in Gowa district 2015-2016. The study type was observational analytic with cross sectional design. The population in this study is all leprosy patients who still undergoing treatment. The sample sizes are 100 respondents which selected by exhaustive sampling method. The result found variables associated toward medical treatment compliance among leprosy patients were accessibility to health centres (p=0.000), knowledge (p=0.037) and family support (p=0.017). However, the drug side effect is not factor associate with medical treatment compliance (p= 0.200).

Keywords: Bivariate analysis; compliance; leprosy; medical treatment.

Introduction

Leprosy also known as Hansen’s disease, chronic infectious disease due to Mycobacterium leprae¹ ². Every year, estimated 250,000 new leprosy cases had recorded worldwide and most of leprosy cases in undeveloped countries³. Most of leprosy patients are recorded in 13 countries included Brazil, Bangladesh, India, Indonesia, Myanmar, Republic of Congo, Ethiopia, Nigeria, Nepal, United Republic of Tanzania, Sri Lanka and the Philippines⁴.

According to World Health Organization (WHO), multi drug treatment had been introduced and effective in decrease both prevalence and leprosy incidence worldwide⁵. The leprosy patients had received combination treatment with three antibiotic such as rifampicin, clofazimine and dapsone⁶. WHO had recommended two multidrug treatment routines for leprosy patients: one for tuberculoid (TT) and leivetuberculoid (BT) leprosy cases and another for borderline (BB), borderline lepromatous (BL) and lepromatous (LL) leprosy cases⁷.

In Indonesia, an estimated 17,025 new leprosy cases lead to top three highest leprosy cases in world for 2014. The prevalence for leprosy cases was 1 per 10,000 population. Based on South Sulawesi Provincial Health Office, there were increasing trend for new leprosy cases. In 2014, 1,142 new leprosy cases had been recorded with Bone district had highest cases (199 cases). Meanwhile, 21 cases on disability level 2 in Gowa district. In Gowa district, case detection rate (CDR) was 17 per 100,000 population and prevalence rate is 1.7 per 10,000 population meant new cases has increased from year to year. The aim of this study is to determine factors associated with medical treatment compliance among leprosy patients in Gowa district 2015-2016.

Methodology

Study Type

This study was used observational analytic with cross sectional design.

Location and Time

The study was conducted from February 2016 to March 2016 in Gowa district.

Population and sample

Population in this study is all leprosy patients in Gowa district who undergone multidrug treatment.
The sample sizes were 100 respondents by selected using exhaustive sampling method.

Data Collection

Primary data was obtained through questionnaires and secondary data was determined from every public health center (Puskesmas) in Gowa district.

Data Analysis

The data was analyzed using SPSS version 13.0. The bivariate analysis was obtained to determine relationship between dependent and independent variables in form of cross tabulation with chi-square test.

Result and Discussion

Bivariate Analysis

Based on Table 1, 19 respondents (19.0%) had medical treatment compliance and there were 15 respondents (60.0%) had less than 30 minutes to health centers and 4 respondents (5.3%) had more than 30 minutes to health centers. Meanwhile, 81 respondents (81.0%) had no medical treatment compliance, while 10 respondents (40.0%) had less than 30 minutes to health centers and 71 respondents (94.7%) had more than 30 minutes to health centers. There was significant relationship between accessibility to health centers with medical treatment compliance.

<table>
<thead>
<tr>
<th>Accessibility to health centres</th>
<th>Medical treatment compliance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>≤ 30 minutes</td>
<td>15</td>
<td>60.0</td>
<td>10</td>
</tr>
<tr>
<td>&gt; 30 minutes</td>
<td>4</td>
<td>5.3</td>
<td>71</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>19.0</td>
<td>81</td>
</tr>
</tbody>
</table>

There were 9 respondents (32.1%) had high knowledge and 10 respondents (13.9%) had low knowledge with medical treatment compliance. Besides, 19 respondents (67.9%) had high knowledge and 62 respondents (86.1%) had low knowledge with no medical treatment compliance. Based on chi-square test, there was significant relationship between knowledge and medical treatment compliance in Gowa district (p= 0.037< 0.05) as shown in Table 2. Furthermore, 19 respondents (63.3%) had family support and 1 respondent (1.4%) had no family support with medical treatment compliance. Besides, 11 respondents (36.7%) had family support and 69 respondents (98.6%) had no family support without medical treatment compliance. There was significant relationship between family support and medical treatment compliance in Gowa district as shown in Table 3.

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Medical treatment compliance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>High</td>
<td>9</td>
<td>32.1</td>
<td>19</td>
</tr>
<tr>
<td>Low</td>
<td>10</td>
<td>13.9</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>19.0</td>
<td>81</td>
</tr>
</tbody>
</table>

Table 1. Relationship between accessibility to health centers with medical treatment compliance among leprosy patients in Gowa district 2015-2016

Table 2. Relationship between knowledge with medical treatment compliance among leprosy patients in Gowa district 2015-2016
Table 3. Relationship between family support with medical treatment compliance among leprosy patients in Gowa district 2015-2016

<table>
<thead>
<tr>
<th>Family support</th>
<th>Medical treatment compliance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>11</td>
<td>63.3</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>69</td>
<td>1.4</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>80</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Based on Table 4, 19 respondents (19.2%) had side effects and only 1 respondent (100.0%) had no side effect with medical treatment compliance. In additions, 80 respondents (80.8%) had drug side effects without medical treatment compliance. Based on chi square test, there was no significant relationship between medical side effects and medical treatment compliance in Gowa district.

Table 4. Relationship between medical treatment side effects with medical treatment compliance among leprosy patients in Gowa district 2015-2016

<table>
<thead>
<tr>
<th>Side effects</th>
<th>Medical treatment compliance</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>0</td>
<td>100.0</td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>80</td>
<td>19.2</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>80</td>
<td>20.0</td>
</tr>
</tbody>
</table>

Overall Discussion

The accessibility to health centers is play important role for enhance health quality and equity of life. The result found accessibility to health centres is correlated medical treatment compliance in Gowa district. The accessibility to health center is a factor that affected health center visits. The geographic condition and availability of transportation also contributed on accessibility to health centres. In the United States, a study found 55% of respondents are missed appointment or late arrival due to transportation. In Mozambique, lack of accessibility to health centres due to walking scenario since 66.7% of Mozambican area is in underserved area.

The knowledge is gained through both formal and informal education. Based on chi-square test, knowledge is related to medical treatment compliance among leprosy patients in Gowa district. Most of Puskesmas did not provided detail about leprosy lead patients had lack of knowledge on leprosy transmission. Several studies had been done to determine the knowledge toward diseases among the population. The study found low knowledge among general population toward tuberculosis in North East Libya. The person had high education had better information about disease.

In this study, the family support had been associated with medical treatment compliance among leprosy patients in Gowa district. In general, families had provided support in term of time, spirit, checking medication and others for leprosy patients. Besides, the family also play important roles in reunited patients in the society. The study found most families are less supporting due to limitation of time to take care leprosy patients. In additions, limitation of knowledge in leprosy among families lead to lack of support in term of information toward leprosy patients. This study found no significant
relationship treatment side effect and medical treatment compliance among leprosy patients in Gowa district. Some respondents continued in medical treatment even though treatment had side effects. The health workers had explained to leprosy patients to handle treatment side effects. A study found 10% of non-compliance psychiatric patients because of medication side effect in India\textsuperscript{12}.

**Conclusion**

In conclusions, there was significant relationship between accessibility to health centres, knowledge and family support with medical treatment compliance among leprosy patients in Gowa year 2015-2016. Meanwhile, medical treatment side effects is not associated with medical treatment compliance among leprosy patients in Gowa district.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**REFERENCES**

Effect of Platelet and Haematocrit Contents towards Dengue Haemorrhagic Fever and Impact on Economic Loss in Daya Regional General Hospital 2016

Sudirham¹, Arsunan Arsin¹, Alimin Maidin¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

This work is aimed to find out the effect of the platelet and hematocrit content on the Dengue Hemorrhagic Fever degree and its impact on the economic loss. This was an analytic observation research with the cross sectional approach. The research was conducted in Daya Regional General Hospital. Data were collected using the purposive sampling technique. The data collected through the questionnaire and interview with the patients and their families. This work used the pathway analysis. The research result indicated that there is effect of the platelet amount on the dengue fever degree (p=0.000) with the variable coefficiency of the negative value (0.424). Also, there is no effect of the hematocrit amount on the dengue fever degree (p=0.649) with the variable coefficiency of the negative value (0.045). In addition, the result showed that there is effect of the dengue fever on the direct cost (p=0.000) with the variable coefficiency of the positive value (0.374). Finally, there was also effect of the dengue fever degree on the indirect cost (p=0.118) with the variable coefficiency of the positive value (0.280).

Keywords: dengue fever; hematocrit; economic loss; platelet.

Introduction

Dengue Hemorrhagic Fever, DHF is found in tropical and subtropical areas. The number of DHF cases in Indonesia ranks first each year with the highest case in Southeast Asia¹. DHF disease was first discovered in Surabaya in 1968 with 58 people experiencing pain and 24 people died and the number of disseminations increasingly widespread all provinces in Indonesia². WHO (World Health Organization) states about 2.5 billion people in the world at risk of dengue virus infection. WHO describes cases of dengue fever around the world every year there are 50-100 million, of which there are 250,000-500,000 cases of dengue fever with a death rate of about 24,000 people per year³. Asia ranks first in the number of DHF patients each year, according to WHO, one of which is Indonesia with the highest dengue fever case in Southeast Asia⁴.

DHF is an infectious disease caused by dengue virus. DHF disease is not transmitted directly from person to person, but is transmitted to humans through Aedes Aegypti mosquito bites that cause some symptoms, one of them is high fever symptoms. Generally, DHF patients experience symptoms of sudden high fever for 2-7 days, followed by critical phase. In the critical phase, the patient has no fever, but this is the first sign of shock when delayed in handling⁵. The guidelines used in establishing the diagnosis of DHF to date are the criteria set by the WHO in 1999. The diagnosis of DHF can be established when two clinical criteria are found and two laboratory criteria. By relying on WHO laboratory criteria, low platelet count (thrombocytopenia) and plasma leakage marked with hemoconcentration are indicators of the severity of dengue diseases³.

Thrombocyte and hematocrit levels cannot always be used as a reference to assess the state of the patient because platelet and hematocrit levels do not always indicate the factual condition of the severity of the illness. According Widyanti et al⁶. stated that this value shows the relationship between the severity of DHF and hematocrit is a positive relationship.

Several studies have been conducted to determine whether there is a relationship between hematocrit and...
platelet values with the severity of DHF. Syumarta et al. found that platelets had a non-significant association with clinical DHF. In a study conducted by Putri et al., found a significant relationship between thrombocyte and hematocrit with the degree of DHF.

The immediate economic impact felt by DHF patients is the cost of treatment. Indirect impacts are the loss of work time, school time and other family costs such as transportation and accommodation during patient care. Research conducted by Gu et al. stated that dengue is an endemic disease in Guangzhou that has been the main disease in decades and caused economic losses to the sufferer. The total cost of a dengue fever economy far outweighs the cost that is as simple as being expended on vector control. Patients, overnight, direct mortality and morbidity, together with the potential costs of time loss and productivity due to illness also need to be considered. Extensive research has been done to analyze the economic burden of dengue fever. In America, the annual economic burden of dengue is estimated at around US $ 2.1 billion. Research conducted by Huy et al. in Cambodia showed the total cost related to dengue was no different from other febrile illnesses (31.5 vs. 27.2 US $, p = 0.44). Hospitalization nearly tripled the cost of dengue (14.3-40.1 US $) and doubled the cost of other febrile illnesses (17.0-36.2 US $).

Brief description on the background of the above problem, this work is done to determine the effect of thrombocyte and hematocrit levels on the degree of DHF and its impact on economic loss in Daya Regional General Hospital 2016.

Methodology

Research Type

The type of the research was observational analytic study with cross sectional study design with observation and measurement on the effect of thrombocyte and hematocrit values on the degree of DHF and its impact on the economic losses borne by dengue hemorrhagic patients in Daya Regional General Hospital 2016.

Location and Time

This research was conducted at General Hospital of Daya Area at the inpatient. The reason the research was conducted at that location was the General Hospital of Daya Area is one of the hospital that treated the most dengue fever patients in Makassar. The time of study was conducted from November to December 2016.

Population and Sample

The population of this study were all dengue fever patients recorded in the General Hospital of Daya District from January to November 2016 amounted to 257 people. Determination of the number of samples is done by counting the number of samples using the formula Lemeshow et al. and the sample of this study amounted to 57 respondents.

Data Collection

Primary data were obtained through research questionnaires and interviews with selected patient or patient families being sampled. Secondary data were obtained through medical records, district health profiles, hospital health profiles and a number of literature related to the research object.

Data Analysis

Data analysis was done by bivariate, and multivariate analysis using SPSS program. Bivariate analysis is used to test the relationship of each variable by using Person Correlation Product moment. Multivariate analysis in this study was done using pathway analysis with the help of computer program application of Analysis of Moment Structure (AMOS).

Result and Discussion

Direct and Indirect cost

Based on data analysis result obtained total patient expenditure for direct cost is Rp 188,281,984, and total of patient expenditure for indirect cost is Rp 84,500,101.

a) Years of Life Loss (YLL)

Years of life loss is the number of years lost because the population died before reaching the average life expectancy (LE). \( YLL = \frac{\text{number of deaths of a disease}}{\text{UHH} - \text{age at death} \times \text{total annual income}} \). Thus, \( YLL = 0 \times 72.5 - 0 \times 27,000,000 = 0 \). Based on the calculation of Years of life (YLL) Dengue Hemorrhagic Disease at Daya Regional General Hospital is 0 because during the study period there were no patients or patients who died.

b) Years Lived With Disability (YLD)

Years of lived with disability loss is the number of years lost because someone fell ill and unable to
perform daily activities. The minimum wage of South Sulawesi province for 2016 is Rp 2,250,000, (Provincial Government, 2016). To calculate YLD can be used the following formula: YLD = Total sick days x Total patient x Province minimum wage per year. Total sick days = 386/247 = 1.56. Total patients = 83 people. Provincial Minimum Wage = Rp. 2.250.000 x 12 = Rp. 27,000,000. Therefore, YLD = 1.56 x 83 x 27,000,000 = Rp 3.502.129.555.

c) Disability Adjusted of Life Years (DALY)

Disability Adjusted of Life Years the number of productive years lost due to illness plus the number of years lost due to premature death. So to calculate DALY (Disability Adjusted Life Years) used the following formula, DALY = YLD + YLL. Therefore DALY = = 3.502.129.555 + 0 = Rp 3.502. 129.555. From the calculation of Disability Adjusted of Life Years (DALY) shows the number of productive years lost due to illness plus the number of years lost due to premature death (DALY) due to Dengue Hemorrhagic disease is Rp 3.502.129.555.

d) Total economic Losses

To calculate total economic losses in the following formula,

\[
\text{Total Economic Losses} = \text{Total Direct Cost} + \text{Total Indirect Cost} + \text{DALY}.
\]

Thus, based on the calculation results obtained total economic losses due to dengue hemorrhagic disease in Daya Regional General Hospital in 2016 amounting to Rp 3,774,911,640.

Bivariate Analysis

Bivariate analysis in this section using Pearson correlation test, the results of the analysis can be seen in table 1. Results from Table 1 shows that the Mean hematocrit value 38.47 and severity 1.28. Statistical test results obtained p value (0.907)> 0.05 which means that there is no relationship between the hematocrit with the degree of severity. Also, the mean platelets value is 109.86. Statistical test results obtained p value (0.000)< 0.05 hat there is a relationship between platelets and degree of severity. In addition, the Mean value of degree of severity 1.28 and direct cost of 2268458. Statistical test results obtained p value (0.001)<0.05 which means that there is a relationship between the degree of severity and direct costs. On the other hand, the mean value of degree of severity 1.28 and indirect cost of 1018074. Statistical test results obtained p value (0.117)> 0.05 which means that there is no relationship between degree of severity and indirect cost.

Table 1. The relationship between Independent variables and Dependent

<table>
<thead>
<tr>
<th>Variable</th>
<th>mean±SD</th>
<th>Value p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematocrit</td>
<td>38.47±10.68</td>
<td>0.907</td>
</tr>
<tr>
<td>Degree of Severity</td>
<td>1.28±0.51</td>
<td></td>
</tr>
<tr>
<td>Platelets</td>
<td>109.86±46.55</td>
<td>0.000</td>
</tr>
<tr>
<td>Degree of Severity</td>
<td>1.28±0.51</td>
<td></td>
</tr>
<tr>
<td>Degree of Severity</td>
<td>1.28±0.51</td>
<td>0.001</td>
</tr>
<tr>
<td>Direct cost</td>
<td>2268457.64±719999.55</td>
<td></td>
</tr>
<tr>
<td>Degree of Severity</td>
<td>1.28±0.51</td>
<td>0.117</td>
</tr>
<tr>
<td>Indirect Costs</td>
<td>1018073.51±480093.83</td>
<td></td>
</tr>
</tbody>
</table>

Multivariate Analysis

The tested hypothesis that explains the causal relationship between thrombocyte, hematocrit, degree of severity, direct costs, and indirect costs in patients with DBD in RSUD Daya Kota Makassar is shown in Table 2. Thus the results are presented as follow. The research hypothesis for the influence of platelets to the degree of severity was, H1: There is an influence between the platelets variable and the degree of severity. From the allegations after tested it turns out the platelets -0.425. The influence of platelets is statistically significant because it is known that the significance of hematocrit variable of 0.000 is <0.05, then H0 is rejected which means there is significant effect of the platelets variable on the variable of severity.

Table 2. Results of Regression Weight

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platelets</td>
<td>Degree of Severity</td>
<td>-0.424</td>
</tr>
<tr>
<td>Hematocrit</td>
<td>Degree of Severity</td>
<td>-0.045</td>
</tr>
<tr>
<td>Degree of Severity</td>
<td>Direct cost</td>
<td>0.374</td>
</tr>
<tr>
<td>Degree of Severity</td>
<td>Indirect cost</td>
<td>0.118</td>
</tr>
</tbody>
</table>
The research hypothesis for the influence of hematocrit to the degree of severity was, H1: There is an influence between the hematocrit variable and the degree of severity. From the allegations after tested it turns out the hematocrit variable coefficient is negative of 0.045. The influence of hematocrit is not statistically significant because it is known that the significance of hematocrit variable of 0.649 is greater than 0.05, then H0 is accepted which means there is no significant effect of the hematocrit variable on the variable of severity.

The research hypothesis to influence the degree of severity to direct costs was, H1: There is an influence between variable severity and direct cost. From the allegations after tested it turns out the coefficient of variable severity is positive at 0.374. The influence of degree of severity is statistically significant because it is known that the significance of the severity variable is <0.000 less than 0.05, then H0 is rejected which means there is a significant influence of the variable of severity to the total direct cost variable.

The research hypothesis to influence the degree of severity against indirect costs was, H1: There is an influence between variable severity and indirect costs. Of the allegations after tested it turns out the coefficient of variable severity is positive at 0.118. The influence of degree of severity is not statistically significant because it is known that the significance of the variable severity of 0.280 is greater than 0.05, then H0 is accepted which means there is no significant influence of the variable of severity to the indirect total cost variable.

**Overall Discussion**

The results of the research indicate the total direct costs incurred by the patient is Rp 188,281,984 with the average amount of direct cost is Rp 2,268,457. This is in line with research conducted by As'ad where found the average direct cost incurred by DHF patients is Rp 688,060.

The result of the research indicates the total non-direct costs incurred by the patient is Rp 84,500,101, with the indirect cost is Rp 1,018,074. This is in line with the research conducted by As'ad where found the average direct cost incurred by DHF patients is Rp 823,333. Research conducted by Shepard et al shows indirect costs for dengue fever per person in Bhutan $34.5 US Dollar, Brunei Darussalam $733.6 US Dollar, in Indonesia $52.3 US Dollar. This study shows the varied indirect costs in each country depending on economic conditions and health services in the country. The total economic loss is the overall cost incurred during the treatment ie direct cost of indirect costs + DALY. The results showed the total economic losses due to dengue hemorrhagic disease in RSUD Daya 2016 is Rp 3,774,911.640. Other research conducted by Shepard et al shows the total economic loss due to dengue hemorrhagic disease (2001-2010) in Cambodia $16.5 Million US Dollar, Myanmar $14.5 Million US Dollar, Singapore $67.1 Million US Dollar.

From the results of the research, there is an effect of the degree of severity to the direct cost (p <0.005) with the variable coefficient 0.374. These results show that the effect of severity is statistically significant, the variable coefficient 0.374 shows the positive direction means the higher the degree of severity the greater the direct costs to be incurred. Research conducted by Kallaru et al in chronic obstructive pulmonary disease in India showed significant results between stage of lung disease and direct cost (p = 0.000). From result of research obtained no effect of degree of severity to indirect cost (p = 0.280) with variable coefficient 0.118. This result shows that the effect of degree of severity is not statistically significant, the variable coefficient of 0.118 indicates the positive direction means the higher the severity the greater the no direct cost that must be issued.

Research conducted by Kallaru et al in chronic obstructive pulmonary disease in India showed significant results between stage of lung disease and direct cost (p = 0.000). The average cost spent by patients with stage II Chronic Obstructive Pulmonary (COPD) was Rs.3179.62 per hospital visit, stage III was Rs.16414.79 and stage IV was Rs.44077.16 per visit. From result of research obtained no effect of degree of severity to indirect cost (p = 0.280) with variable coefficient 0.114. This result shows that the influence of degree of severity is not statistically significant, the variable coefficient of 0.114 indicates the positive direction means the higher the severity the greater the no direct cost that must be issued.

Another study conducted by Bavbek et al, also showed significant results between disease severity and direct cost (p <0.01) where direct costs for severe attacks were 308 Euro and mild attacks 128.6 Euro.
Conclusion

Thus, from the work done, the following conclusions are made. First, the total economic loss due to dengue hemorrhagic disease in Daya Regional General Hospital in 2016 is Rp 2.619.580.649. Secondly, there is effect of the platelet amount on the dengue fever degree with the variable coefficient of negative value. Thirdly, there is no influence of the amount of hematocrit on Dengue Hemorrhagic degree with variable coefficient of negative value. In addition, there is influence of degree of dengue hemorrhagic fever to direct cost with variable coefficient of positive value. Finally, there is no effect of degree of Dengue Hemorrhagic Fever on indirect cost with variable coefficient of positive value.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

14. As’ad H. Economic Loss (Economic Loss) Patients Inpatient Productive Age Five Diseases in the Regional General Hospital of Mamuju Regency. Hasanuddin University, Jan 12002;7(4): 102.
Intermediate Determinants in Maternal Mortality: Case Study  
Tojo Una, Una District

Syarifuddin¹, Ridwan Thaha⁴, Andi Zulkifli Abdullah¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea,  
Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study is to describe determinants in maternal mortality in Tojo Una Una. This study was used qualitative research and phenomenological approach. This study was conducted from January to February 2016 in Tojo Una Una district of central Sulawesi. The informants were selected based on purposive sampling method and consisted of family of cases, midwives and coordinator midwives. The data collection is obtained through observation and in-depth interviews. The result found maternal nutritional status is among risk factors with suffered anaemia, diabetes mellitus, stroke, hypertension, and hepatitis. Besides, late maternal age also increased risk in maternal mortality. The medical treatment delay included delay in identified pregnancy risk and dangerous sign, delay in accessibility to health facilities and taking good health services. The obstacles in access to health centres is caused by long distance to hospital, high transportation fees, limitation of public transportation availability and administrative requirement that burden the patient’s family members.

Keywords: Delay causes; health service utilization; nutritional status; reproductive status

Introduction

Every year, estimated more than 350,000 women died from pregnancy or delivery complication and sub-Saharan Africa and Asia had recorded highest maternal mortality for 50% and 45%¹². Based on hospital record, approximately 25% of maternal mortality are caused by hemorrhage, 15% of infections, 12% by hypertension and 8% by labor dystocia³. The estimation between 15% to 20% of pregnant women in both developed and developing countries had faced high risk in pregnancy complications due to limitation of health care quality⁴.

Maternal mortality is classified as women death occurring during pregnancy period or within 42 days of termination of pregnancy⁵⁶. Several factors influenced maternal mortality such as pregnancy complications, labor and obstetric complications. The most influenced determinants included maternal nutritional status, reproductive status, accessibility to health facilities, health care behavior and other unknown or unexpected factors. Besides, socio-cultural and economic factors also affected in maternal mortality. In additions, the delay in decision making also resulted on maternal mortality. The decision making in family had influenced by several factors such as education, family knowledge, women status in family, socioeconomic status, health insurance and culture. A study found there is relationship between age, education, paternal employment status, family income, distance to health centers, maternal knowledge and attitude with decision making on health services utilization⁷. In central of Sulawesi, Tojo Una Una district had highest number of maternal mortality which is 35 cases in 2013 (maternal mortality rate is 352 per 100,000 population)⁸. The aim of this study to describe determinants in maternal mortality in Tojo Una Una.

Methodology

Study Type

This study was used qualitative research and phenomenological approach.
Location and Time

This study was conducted from January to February 2016 in Tojo Una Una district of central Sulawesi. The study focuses on maternal mortality cases according to preliminary observation result. The site selection is determined based on maternal mortality data.

Population and Sample

The informants were selected based on purposive sampling method. The informant’s criteria in this study as bellows:

a) Family of cases who willing to be interviewed and priority to close family such husband, parents, in-laws and sibling;

b) Midwife who serving in village;

c) Midwife coordinator of working area of the cases.

Data Collection

The data collection is obtained through observation and in-depth interviews.

Result and Discussion

In this study, there are 6 cases for maternal mortality had recorded in 2015 and 2016. Meanwhile, 2 maternal mortality occurred in mother aged 40 years and 43 years old. Four cases found in hospital, each one case occurred in community health centre (Puskesmas) and house. The maternal mortality causes included retained placenta, bleeding, depression and molar pregnancy. All mothers had received ANC in village birth delivery post (Polindes), integrated health post (Posyandu) and Puskesmas.

This study found anaemia symptom is detected during their ANC as shown in Table 1. The midwife who detects anaemia based on symptom suffered by pregnant women. The anaemia symptoms included fatigue, pale, short breathing and irregular heart beat rate. The midwife has suggested pregnant women for further examination in the hospital due to limitation on healthcare facilities. In addition, death causes also due to depression, hepatitis, hypertension and diabetes mellitus (DM) and stroke.

Based on body mass index (BMI), only one case was in obesity category with BMI 31.217 but there is no specific record in body height and weight. The obesity and overweight lead to cardiovascular disease including hypertension, DM and other diseases.

Table 1. Nutritional status variables toward maternal mortality

<table>
<thead>
<tr>
<th>Nutritional status variables</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaemia</td>
<td>The anaemia is detected in mothers during their ANC and further medical examination in hospital due to limitation in healthcare facilities. Besides, informants also detected other diseases such as chronic hypertension, DM and stroke in pregnant women.</td>
</tr>
<tr>
<td>BMI</td>
<td>No specific on maternal body height and weight but only one case was in obesity category.</td>
</tr>
</tbody>
</table>

As described in Table 2, the ideal age for pregnancy is between 20 years and 35 years. The high risk in maternal mortality occurs in late age. The study found no maternal mortality cases with close pregnancy gap. The large pregnancy gap was due to difficulties in babysitting. The study found gravidity and parity more than 2 had high risk for pregnant women. Besides, maternal age and parity number influenced maternal mortality. The delay identified of pregnancy risk and dangerous signs occur in midwives, pregnant women and families. The midwives identified pregnancy risk and dangerous sign by diagnosis in pregnancy women with anemia and molar pregnancy. Besides, families preferred self-medication on pregnancy women with abdominal pain.
Table 2. Maternal status variables toward maternal mortality

<table>
<thead>
<tr>
<th>Maternal status variables</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age</td>
<td>The maternal age is between 20 years and 35 years. The late pregnancy caused hypertension, DM and stroke.</td>
</tr>
<tr>
<td>Pregnancy gap</td>
<td>The informants did not sure about pregnancy gap. Besides, informants suggested pregnancy gap were 7 years.</td>
</tr>
<tr>
<td>Gravidity</td>
<td>The gravidity number in this study is 4 times. Besides, there are neonatal mortality occurred.</td>
</tr>
</tbody>
</table>

Besides, delay in accessibility on health facilities also among cause in maternal mortality. The delay in accessibility in health facilities in this study were due to families’ decision, delay in references system in Puskesmas for further treatment at the hospital and preference in treatment with village midwives. This study found limitation in medical equipment in Puskesmas and late to the hospital caused maternal mortality. The delay on accessibility in health facilities due to distance, emergency period and geographic. Summary of delay causes variables towards maternal mortality is shown in Table 3.

Table 3. Delay causes variables toward maternal mortality

<table>
<thead>
<tr>
<th>Delay variables</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay in identify on pregnancy risk and dangerous signs</td>
<td>The delay was due to families preferred self-medication on victim and late to seek treatment in hospital.</td>
</tr>
<tr>
<td>Delay on accessibility in health facilities</td>
<td>The victim preferred contacted midwife before going to hospital.</td>
</tr>
<tr>
<td>Delay in taking good health services</td>
<td>The health workers were not on duty in Puskesmas and had decided to seek treatment in the hospital.</td>
</tr>
</tbody>
</table>

This study found distance from health facilities is among cause lead to maternal mortality as summarized in table 4. Although, there is Puskesmas in the area, but no any health worker and limitation of medical equipment causes patient need to go hospital. There are many health insurances such as delivery assurance (Jampersal), public health insurance (Jamkesmas) and social insurance administration organization (BPJS). Besides, the families need spend on transportation fees for seek treatment in the hospital. The expensive medical cost lead families preferred traditional healers for birth delivery.

Table 4. Health service utilization variables toward maternal mortality

<table>
<thead>
<tr>
<th>Health service utilization variables</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance from health facilities</td>
<td>The distance from house to health service such as Puskesmas and Poskesdes are closer than hospital.</td>
</tr>
<tr>
<td>Health services cost</td>
<td>The patients are not covered with health insurance would be charged for medical cost. The community still lack understanding on free health program.</td>
</tr>
<tr>
<td>Geographical conditions</td>
<td>The poor in geographic and road conditions caused delay in accessibility to health facilities.</td>
</tr>
<tr>
<td>Transportation facilities</td>
<td>The limitation in transportation facilities to seek treatment in health services. The public transportation only operated once per day in Tojo Una Una district.</td>
</tr>
</tbody>
</table>
The poor in geographical and road conditions also lead in difficulty on accessibility to health facilities. The limitation in transportation facilities is that the public transportations only available in the morning. The study found difficulty in administration requirements when the community seek treatment in Puskesmas and hospital. In addition, there is lack of family support in accessibility to health facilities due to their beliefs and lack of knowledge. Besides, the family preferred birth delivery in house and need assistance of midwife or traditional healers during birth delivery. The families would only bring pregnant women to hospital if emergency occurs.

The study also found that accessibility on health facilities was not determined by ethnic and no specific ethnic pattern in accessing health services. The health service utilization is more influenced by family decision making based on consideration of cost, distance geographical conditions and transportation facilities.

**Overall Discussion**

Based on this study, maternal nutritional status increased risk in maternal mortality. Several factors such as maternal nutritional status, anaemia, diseases and complication history on previous pregnancy and delivery had influenced maternal mortality. Besides, nutritional status before pregnancy also related to pregnancy risks. The result also found anaemia symptom in pregnant women is detected by midwife before further examination in the hospital. Furthermore, maternal mortality was due to comorbid diseases such as hypertension, diabetes mellitus and stroke.

Meanwhile, overweight and obesity also contributed in maternal mortality. The result found pregnant women weight is still in normal category from early pregnancy until birth delivery. The pregnant women who experienced under/overweight would lack in folic acid, iron and calcium and increased risk of fetus abnormalities, anaemia, small fetus weights and premature labor. Besides, obesity risk in pregnant women is hypertension, preeclampsia, DM which are indirect cause of maternal mortality.

The late pregnancy among women increased complication risk especially preeclampsia. The pregnancy among women aged more than 35 years old have higher risk of preeclampsia than younger women. Most suitable age for pregnancy is between 20 years and 30 years. In additions, pregnancy gap in this study is still in normal level. The ideal pregnancy gap is at least 2 years. A study found mother with less than 2 years pregnancy gap had higher risk in maternal mortality. Besides, pregnancy gap less than 24 months lead in high risk for suffering severe anaemia compared to pregnant women had 36 months of pregnancy gap.

The result showed gravidity among women is still normal category. The number of children leads to tendency in shaping desired family size. In Yogyakarta, ideal numbers of children are 4 and 5 children. There are compositional factors consisting of maternal age, education, employment, father’s employment, religion, number of children and house location. The maternal mortality is affected by delay in decision making to seek treatment in health facility. The delay in seek treatment were due to distance of health facilities and health service cost.

The delay in accessibility on health facilities also caused in maternal mortality. This delay in decision making was due to several factors such as strong traditional medicine practices in pregnancy care and lack of maternal knowledge. In additions, families also claimed limitation of public transportation; high transportation fees, high medicine cost and no health insurance caused delay in seek treatment in health centres. The lack of resources, health facilities and health service quality at health centre are contributed in delay in taking good health services among pregnant women. In rural areas, pregnant women more preferred birth delivery with help of traditional healer or midwife and no immediate action on birth complication lead to maternal mortality.

The distance of health facilities is among factor in birth delivery for pregnant women since house location is far away with health care facilities (Puskesmas and hospital). Most of patients preferred seek treatment at nearest health facilities. The birth cost also influenced in decision making for birth delivery place unless this cost is covered by health insurance. Besides, transportation fees and medical cost affected on family’s decision making for seek treatment in health centres. Other factor such as poor geographical and road conditions caused delay in accessibility to health facilities. The geographic condition has negative influences to health services utilization in Bajo community.
The limitation in transportation also delayed in accessibility to health facilities among pregnant women. Based on this study, the public transportation only available on morning session and far distance from hospital increased transportation fees. The lack for health services quality lead women do not receive proper treatment in health centres. The healthcare facilities utilization was likely due to several factors such as distance, cost, geographical condition and transportation facilities which influenced mother or families in decision making for access health services.

**Conclusion**

In conclusions, several factors such as maternal nutritional status, age, gravidity, delay in seek treatment in health facilities, far distance, geographical conditions, high transportation and medical costs and limitation in transportation facilities affected decision making for modern health service which is increased risk in maternal mortality.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


14. Muchtar R, Purnomo E. Proximate Determinant
Comparative of Sexual Satisfaction between Women with and without Tubectomy in Makassar 2015

Trisna Pangestuning Tyas¹, Nasrudin A. M¹, Irfan Idris¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245.
Sulawesi Selatan, Indonesia

Abstract

The study aims to determine the sexual satisfaction levels between women with and without tubectomy in Makassar city. The study was used cross sectional research. The study was conducted within one month in working area of Makassar city Health Office. The study population were all women who are in family planning program in working area of Makassar city. The sample sizes were 100 respondents which divided into control and intervention groups which met study criteria. The samples were obtained by using purposive sampling methods. In this study, primary data was using questionnaire Female Sexual Function Index (FSFI) in obtained data. The data was analysed using SPSS program. The bivariate analysis was used chi square test to compare the sexual satisfaction between women with and without tubectomy. The chi square test also found sexual function between women with and without tubectomy in sexual desire (p=0.774), arousal (p=0.679), lubrication (p=0.275), orgasm (p=1.000), satisfaction (p=0.408) and pain (p=0.424).

Keywords: Arousal; Female sexual function index satisfaction; Lubrication; Pain; Satisfaction; Tubectomy

Introduction

The contraception is referred as intentional prevention of conception through devices, chemical, drug, surgical procedures and sexual practices. Approximately, 222 million of women had improper need for contraception and 80 million unwanted pregnancies occurs in global annually caused by non-use or inconsistent use of contraceptive methods. The contraceptive target to avoid sperms are released into female reproductive organs (ejaculation), egg released from ovary (ovulation), intercourse of egg and sperm (fertilisation), embryo attachment in the uterus wall (implantation) or termination of developing embryo from the uterus (abortion).

Female sterilization is among contraceptive methods. Female sterilization had performed in many ways included minilaparotomy, laparoscopic sterilization and hysteroscopic methods. Female sterilization such as tubectomy or tubal ligation is permanent contraception method without affected sexual and endocrine function. In other hands, contraception especially tubectomy procedure might influenced female sexual functions in positive and negative way. Several studies had been done to determine the effect of contraception toward female sexual functions. Some studies concluded contraception method had no significant influenced in female sexual functions and some studies found contraception method had affected female sexual functions. The study aimed to determine the sexual satisfaction levels between women with tubectomy and women without tubectomy in Makassar city.

Methodology

Study design and location

The study was used cross sectional research. The study was conducted within one month in working area of Makassar city Health Office.

Study population and sample

The study population were all women who are in family planning program in working area of Makassar city. The sample sizes were 100 respondents which divided into control and intervention groups which met study criteria included women with tubectomy and husbands are willing to be respondents, aged between 35 years and 40 years, living together with husband in...
last 3 months and had tubectomy at least 3 months. The control group is used contraceptive pills included five types of contraceptive method and intervention group contained women who had tubectomy included women had tubectomy in caesarean section and interval tubal ligation. The samples were obtained by using purposive sampling methods.

Data analysis

In this study, primary data was using questionnaire Female Sexual Function Index (FSFI) in obtained data. The data was analysed using SPSS program. The bivariate analysis is used chi square test to compare the sexual satisfaction between women with tubectomy and without tubectomy.

Results and Discussion

Based on Figure 1, women in young age with low parity had higher sexual desire, arousal, lubrication, orgasm, satisfaction and pain than women in old age with high parity among women with tubectomy. For women without tubectomy, women in young age with low parity had inconsistent value for each sexual function domain.

Based on Table 1, 11 respondents (57.9%) were aged between 35 years and 37 years and 19 respondents (61.3%) were aged 38 years and 40 years had sexual dysfunction. The Fisher test found no significant relationship between age and sexual function among women with tubectomy. For education level, 8 respondents (40%) had low education level and 12 respondents (40%) had high education level had normal sexual function. The statistical test found no significant relationship between education level and sexual function among women with tubectomy. Meanwhile, 27 respondents (62.8%) were housewives and 3 respondents (42.9%) were civil servant had sexual dysfunction. The Fisher test showed no significant relationship between employment status and sexual satisfaction among women with tubectomy. There were 16 respondents (37.2%) had parity between 1 and 3 and 4 respondents (44.4%) had parity between 4 and 9 had normal sexual function. The statistical test showed no significant between parity and sexual function among women with tubectomy.

Table 1. Comparison of sexual satisfaction of women with tubectomy based on respondent characteristic in Makassar 2015

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Sexual function</th>
<th></th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dysfunction</td>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-37</td>
<td>11</td>
<td>57.9</td>
<td>8</td>
<td>42.1</td>
</tr>
<tr>
<td>38-40</td>
<td>19</td>
<td>61.3</td>
<td>12</td>
<td>38.7</td>
</tr>
</tbody>
</table>
Based on Table 2, there were 16 respondents (64%) were aged 35 years and 37 years and 15 respondents (60%) were aged 38 years and 40 years had sexual dysfunction for women without tubectomy. The Fisher test found no significant relationship between age and sexual function among women without tubectomy. Meanwhile, 4 respondents (23.5%) had low education levels and 15 respondents (45.4%) had high education level which had normal sexual function. There was no significant relationship between education level and sexual function among women without tubectomy. In additions, 30 respondents (61.2%) were housewives and 1 respondent (100%) were civil servant had sexual dysfunction. The Fisher test found no significant relationship between employment status and sexual function among women without tubectomy.

Table 2. Comparison of sexual satisfaction of women without tubectomy based on respondent characteristic in Makassar 2015

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Sexual function</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dysfunction</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-37</td>
<td>16</td>
<td>64</td>
</tr>
<tr>
<td>38-40</td>
<td>15</td>
<td>60</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>13</td>
<td>76.5</td>
</tr>
<tr>
<td>High</td>
<td>18</td>
<td>54.5</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>30</td>
<td>61.2</td>
</tr>
<tr>
<td>Civil servant</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>21</td>
<td>56.8</td>
</tr>
<tr>
<td>4-9</td>
<td>10</td>
<td>77</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>62</td>
</tr>
</tbody>
</table>
Meanwhile, there were 30 respondents (60%) had sexual dysfunction and 20 respondents (40%) had normal sexual function among women with tubectomy. Besides, 31 respondents (62%) had sexual dysfunction and 19 respondents (38%) had normal sexual function among women without tubectomy as shown in Table 3.

Table 3. Comparison of sexual satisfaction between women with tubectomy and women without tubectomy in Makassar city

<table>
<thead>
<tr>
<th>Group</th>
<th>Sexual function</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dysfunction</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Tubectomy</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Non-tubectomy</td>
<td>31</td>
<td>62</td>
</tr>
</tbody>
</table>

There were 42 respondents (84%) had normal sexual function and 8 respondents (16%) had sexual dysfunction with sexual desire. There was no significant relationship between sexual function and sexual desire among women with tubectomy. Meanwhile, 33 respondents (66%) had normal sexual function with sexual arousal and 17 respondents (34%) had sexual dysfunction with sexual arousal. The chi square test found significant relationship between sexual function and sexual arousal. There were 38 respondents (76%) had normal sexual function and 12 respondents (24%) had sexual dysfunction with sexual lubrication. Besides, 38 respondents (76%) had normal sexual function and 12 respondents (24%) had sexual dysfunction with orgasm sexual. There was no significant relationship between sexual function with orgasm sexual. Besides, 29 respondents (76%) had normal sexual function and 21 respondents (42%) had sexual dysfunction with sexual satisfaction. The chi square test found no significant relationship between sexual function toward sexual satisfaction. There were 28 respondents (56%) had normal sexual function and 22 respondents (44%) had sexual dysfunction with sexual pain. There was significant relationship between sexual function and sexual pain.

Table 4. Analysis of sexual function domain among women with tubectomy in Makassar 2015

<table>
<thead>
<tr>
<th>Sexual function domain</th>
<th>Sexual function</th>
<th></th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Dysfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Desire</td>
<td>42</td>
<td>84</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Arousal</td>
<td>33</td>
<td>66</td>
<td>17</td>
<td>34</td>
</tr>
<tr>
<td>Lubrication</td>
<td>38</td>
<td>76</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Orgasm</td>
<td>38</td>
<td>76</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>29</td>
<td>58</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>Pain</td>
<td>28</td>
<td>56</td>
<td>22</td>
<td>44</td>
</tr>
</tbody>
</table>

Based on Table 5, 44 respondents (88%) had normal sexual function and 6 respondents (12%) had sexual dysfunction with sexual desire. The chi square test found no significant relationship between sexual function and sexual desire among women without tubectomy. There was 30 respondents (60%) had normal sexual function and 20 respondents (40%) had sexual dysfunction with sexual arousal. The statistical test found significant
relationship sexual function and sexual arousal among women without tubectomy. Meanwhile, 32 respondents (64%) had normal sexual function and 18 respondents (32%) had sexual dysfunction with sexual lubrication. There was significant relationship between sexual function and sexual lubrication among women without tubectomy. There were 38 respondents (76%) had normal sexual function and 12 respondents (24%) had sexual dysfunction with orgasm sexual. The chi square test found no significant relationship between sexual function and orgasm sexual. Besides, 34 respondents (68%) had normal sexual function and 16 respondents (32%) had sexual dysfunction with sexual satisfaction. There was no significant relationship between sexual function and sexual satisfaction among women without tubectomy. In additions, 23 respondents (46%) had normal sexual function and 27 respondents (54%) had sexual dysfunction with sexual pain. The chi square test showed sexual function and sexual pain among women without tubectomy.

**Table 5. Analysis of sexual function domain among women without tubectomy in Makassar 2015**

<table>
<thead>
<tr>
<th>Sexual function domain</th>
<th>Sexual function</th>
<th>Dysfunction</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Dysfunction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Desire</td>
<td>44</td>
<td>88</td>
<td>6</td>
</tr>
<tr>
<td>Arousal</td>
<td>30</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Lubrication</td>
<td>32</td>
<td>64</td>
<td>18</td>
</tr>
<tr>
<td>Orgasm</td>
<td>38</td>
<td>76</td>
<td>12</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>34</td>
<td>68</td>
<td>16</td>
</tr>
<tr>
<td>Pain</td>
<td>23</td>
<td>46</td>
<td>27</td>
</tr>
</tbody>
</table>

Based on Table 6, there were 42 respondents with tubectomy and 44 respondents without tubectomy had sexual desire, while 33 respondents with tubectomy and 30 respondents without tubectomy with sexual arousal. Meanwhile, 38 respondents with tubectomy and 32 respondents without tubectomy had sexual lubrication, 38 respondents with tubectomy and 38 respondents without tubectomy had sexual orgasm. Besides, 29 respondents with tubectomy and 34 respondents without tubectomy. The chi square test showed no significant relationship between sexual desire, arousal, lubrication, orgasm, satisfaction and pain toward women with tubectomy and women without tubectomy.

**Table 6. Comparison of sexual function domain between women with tubectomy and women without tubectomy in Makassar 2015**

<table>
<thead>
<tr>
<th>Sexual function domain</th>
<th>Tubectomy</th>
<th>Non-tubectomy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desire</td>
<td>42</td>
<td>44</td>
<td>0.774</td>
</tr>
<tr>
<td>Arousal</td>
<td>33</td>
<td>30</td>
<td>0.679</td>
</tr>
<tr>
<td>Lubrication</td>
<td>38</td>
<td>32</td>
<td>0.275</td>
</tr>
<tr>
<td>Orgasm</td>
<td>38</td>
<td>38</td>
<td>1.000</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>29</td>
<td>34</td>
<td>0.408</td>
</tr>
<tr>
<td>Pain</td>
<td>28</td>
<td>23</td>
<td>0.424</td>
</tr>
</tbody>
</table>
**Overall Discussion**

Most women preferred family planning to prevent further pregnancy and confident with contraception method as effective way in their family planning. The tubectomy had been done at the time of childbirth, immediate postpartum or after six weeks postpartum (Allagoa et al., 2014). According to international resources, tubectomy is considered as permanent fertility control method which had low pregnancy chances about 1 in 200 (Date et al., 2014). The results found no differences in sexual satisfaction between women with tubectomy and women without tubectomy.

Based on Table 1 and 2, approximately 40% of respondents in intervention group and 38% of respondents in control group had normal sexual function. The lack of sexual desire is often related with aging, menopause, surgery, certain medical condition and drug side effect. FSFI had been developed as a brief and multidimensional self-report instrument to determine women sexual function. The results on comparison of sexual satisfaction among women with tubectomy and women without tubectomy based on FSFI included sexual arousal, desire, pain, lubrication, orgasm and satisfaction. The statistical test found no significant difference on sexual function domain between women with tubectomy and women without tubectomy. Regan et al. mentioned sexual desire is defined as attraction in sexual objects (other people) or activities or longing to find sexual objects or to engage in sexual activities and not like sexual activity (masturbation, kissing and intercourse) or sexual arousal (erection and vaginal lubrication).

The study showed sexual desire is higher in women with young age and low parity. Most of respondents were older women who aged between 35 years to 40 years which are in perimenopause period. Sexual disorders were associated to age which related to reduce in sex drive, vaginal dryness due to menopause and sexual intercourse. Meanwhile, this study showed both groups had equal number respondents for sexual orgasm. Kunkeri et al. demonstrated 71.1% of women had sexual dysfunction and most common disorders was orgasm, arousal and desire after tubectomy.

The perception among women with tubectomy that no longer become pregnancy, attention to their children lead to lack of sexual problems. Besides, the stress and depression also contributed to the sexual dysfunction. The women who suffered sexual dysfunction had relationship conflict, stress, anxiety or depression, age and poor in health. The women with tubectomy had high levels of sexual satisfaction, sexual pleasure and relationship satisfaction same as women without tubectomy due to their less concern toward unwanted pregnancies. Furthermore, high prevalence of female sexual dysfunction had observed in El Fayoum governate and several factors contributed were age gap, marriage duration and number of children. Indrayani et al. mentioned women with tubectomy had better sexual function than women without tubectomy since there were increased in sexual desire, arousal, lubrication, orgasm and satisfaction. Most women preferred family planning to prevent further pregnancy and confident with contraception method as effective way in their family planning.

**Acknowledgement:** The author would like to thank to all respondents in Makassar city for data input and Faculty of Medicine, Hasanuddin University for unconditionally support.

**Conclusion**

In conclusions, no difference in sexual satisfaction among women with tubectomy and women without tubectomy in Makassar city. The contraceptive devises installation in selected candidates and husbands by trained counsellors helps in psychology among patients toward sexual function after tubectomy.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


3. Ackerson, K, and Zielinski, R. Factors influencing


Effect of Calcium and Vitamin D Supplements Consumption Toward Pregnancy Outcomes among Hypertension Pregnant Women in Poasia and Lepo-Lepo Public Health Centres, Kendari City

Wa Ode Sri Kamba Wuna¹, Irfan Idris¹, Werna Nontji¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

The study aims to determine the effect of calcium and vitamin D supplement consumption among hypertension pregnant women toward pregnancy outcomes in Poasia and Lepo-Lepo Public Health Centres, Kendari city. The study was used a quasi-experimental design with pre-test and post-test design with intervention and control groups. The study was conducted from 24th March to 21st June 2016 at Poasi and Lepo-Lepo Public Health Centres (Puskesmas), Kendari city. The study population were all pregnant women who suffered hypertension with total of 38 pregnant women. The sample sizes were 32 respondents (16 respondents in intervention group and 16 respondents in control group). The samples were obtained with purposive sampling techniques. The data was analysed using SPSS program. The bivariate analysis is determined effect of calcium and vitamin D consumption among hypertension pregnant women toward their pregnancy outcome by using Wilcoxon test and Mann Whitney statistic test. The statistical test showed systolic and diastolic blood pressure changes during pre-test and post-test in intervention group were p=0.001 and p=0.003. Meanwhile, chi square test for effect of calcium and vitamin D supplement consumption toward infant body weight (p=0.000), infant body length (p=0.000), infant head circumference (p= 0.000).

Keywords: Birth body weight; Body length; Diastolic blood pressure; Head circumference; Hypertension; Systolic blood pressure

Introduction

Based on World Health Organization (WHO) factsheet, an estimation of 830 women died from avoidable causes related to pregnancy and childbirth and 99% of maternal mortality happened in developing countries¹. Maternal death is defined as death of women during their pregnancy or within 42 days of their termination of pregnancy due to pregnancy causes related but not from accidental or incidental causes¹. The study had been carried out by Hill et al. found approximately 535 000 maternal mortality in the world between 1990 and 2005 and Sub-Saharan had recorded as much as 50% of cases and Asia had been recorded 45% of cases respectively². Several causes contributed to maternal mortality such as haemorrhage, infection, pregnant-induced hypertension, obstructed labour, malaria, anaemia, preeclampsia, eclampsia³-⁶. Hypertension had affected 20% to 30% of adult population and more than 5% to 8% of all pregnancies in global⁷. The hypertension is considered when systolic blood pressure is ≥160mmHg and/or diastolic blood pressure is ≥110 mmHg on two consecutive blood pressure measurement at least four hours apart⁸.

The calcium and vitamin D deficiency is very common among pregnant women and infants⁹. Vitamin D deficiency in pregnancy had related with high risk of preeclampsia, gestational diabetes mellitus, preterm birth, low birth body weight, impaired fetal skeletal and reduced bone mass. The women who had high risk in vitamin D deficiency included those who had less sunlight exposure, use sunscreen on regular basis, dark-skinned women, mother who had infants with rickets and women with body mass index (BMI) more than 30. The recommendation of vitamin D is 400 IU daily, while
calcium is 1000 mg daily to reduced hypertension and preterm labour. The study aims to determine the effect of calcium and vitamin D supplement consumption among hypertension pregnant women toward pregnancy outcomes in Poasi and Lepo-Lepo (Puskesmas), Kendari city.

Methodology

Study design and location

The study was used a quasi-experimental design with pre-test and post-test design with intervention and control groups. The study was conducted from 24th March to 21st June 2016 at Poasi and Lepo-Lepo Puskesmas in Kendari city.

Study population and sample

The study population were all pregnant women who suffered hypertension with total of 38 pregnant women. The sample sizes were 32 respondents (16 respondents in intervention group and 16 respondents in control group) which met the study criteria i) pregnant women with hypertension and willing to be respondents; ii) maternal age less than 40 years old; iii) pregnant in third trimester between 28 weeks and 32 weeks. The samples were obtained with purposive sampling techniques.

Data collection

The pregnant women were tested the blood for the calcium levels and had given 10 tablets of 500mg calcium lactate supplement and 5 soft gel of vitamin D3 400 IU. The pregnant women in the control group only given with 10 tablets of 500mg calcium lactate supplement. The pregnant women blood levels had been monitored in every week until their labour day and birth weight, length and head circumferences had been measured.

Data analysis

The data was analysed using SPSS program. The bivariate analysis is determined effect of calcium and vitamin D consumption among hypertension pregnant women toward their pregnancy outcome by using Wilcoxon test and Mann Whitney statistic test.

Results and Discussion

Bivariate analysis

Table 1 showed significant changes in systolic blood pressure in the control and intervention groups. The systolic blood pressure changes in the intervention group was more significant than control group. Similarly, diastolic blood pressure in both groups were decreased. However, diastolic blood pressure changes in the control group were considered statistically no significant, p =0.296 > 0.05. Meanwhile, significant change to diastolic blood pressure in the interventional group.

Table 1. Blood pressures changes during pre-test and post-test in the control and intervention groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean±SD</th>
<th>Differences</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Systolic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>135.38±5.40</td>
<td>127.75±5.56</td>
<td>7.63±0.16</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td>132.75±3.86</td>
<td>118.37±5.57</td>
<td>14.38±1.71</td>
</tr>
<tr>
<td>Diastolic</td>
<td></td>
<td>84.00±7.12</td>
<td>82.13±5.95</td>
<td>1.87±1.17</td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>87.00±6.02</td>
<td>79.25±6.36</td>
<td>7.75±0.34</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 illustrates decrease in systolic blood pressure in the control group and intervention groups were prenatally and hypertensive at the beginning of examination. The Wilcoxon test showed significant decrease in systolic blood pressure in the control group who had prehypertension and hypertension (p=0.039<0.05 and p=0.027<0.05) respectively. Meanwhile, statistically significant decrease only occurred in the respondents who experienced prehypertension (p=0.001<0.05). The systolic blood pressure level was reduced among experienced hypertension was considered not statistically significant with p=0.157>0.05. However, systolic blood pressure decreased in the intervention group was significant than in the control group.
Table 2. Systolic blood pressure level changes during intervention period between intervention and control groups

<table>
<thead>
<tr>
<th>Systolic blood pressure</th>
<th>n</th>
<th>Mean±SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>135.38±5.40</td>
<td>127.75±5.56</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>16</td>
<td>132.75±3.86</td>
<td>118.37±5.57</td>
</tr>
<tr>
<td>Hypertension</td>
<td>16</td>
<td>84.00±7.12</td>
<td>82.13±5.95</td>
</tr>
</tbody>
</table>

Table 3 showed significant changes in systolic blood pressure in the control and intervention groups. The systolic blood pressure changes in the intervention group was more significant than control group. Similarly, diastolic blood pressure in both groups were decreased. However, diastolic blood pressure changes in the control group were considered statistically no significant, p =0.296 > 0.05. Meanwhile, significant change to diastolic blood pressure in the interventional group. Thus, calcium and vitamin D supplement had significant effect in reduce blood pressure.

Table 3. Systolic blood pressures changes during pre-test and post-test in the control and intervention groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean±SD</th>
<th>Differences</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>135.38±5.40</td>
<td>127.75±5.56</td>
<td>7.63±0.16</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td>132.75±3.86</td>
<td>118.37±5.57</td>
<td>14.38±1.71</td>
</tr>
<tr>
<td>Diastolic</td>
<td></td>
<td>84.00±7.12</td>
<td>82.13±5.95</td>
<td>1.87±1.17</td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>87.00±6.02</td>
<td>79.25±6.36</td>
<td>7.75±0.34</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td>84.00±7.12</td>
<td>82.13±5.95</td>
<td>1.87±1.17</td>
</tr>
</tbody>
</table>

Table 4 illustrates reduced in diastolic blood pressure in the control and intervention group which were prenatally and hypertensive at the beginning of examination. Wilcoxon test found significant decreased in diastolic blood pressure in the intervention group with hypertension (p=0.007<0.05). The respondents in the control group with normal diastolic blood pressure at the beginning were observed increase at the end of examination but no statistically, p=0.157>0.05. Meanwhile, respondents in the control group with prehypertension and hypertension at beginning examination and reduced diastole blood pressure at end of examination but not statistically significant respectively, p=0.092>0.05 and p=0.157>0.05. Similarly, respondents in the intervention group who had prehypertension at pre-test and decrement in diastolic blood pressure at the end of examination but not statistically significant, p=0.180>0.05.
Table 4. Diastolic blood pressure changes during pre-test and post-test in the control and intervention group

<table>
<thead>
<tr>
<th>Diastolic blood pressure</th>
<th>n</th>
<th>Mean±SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>2</td>
<td>70.00±0.00</td>
<td>80.00±0.00</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>9</td>
<td>83.10±3.30</td>
<td>79.80±5.90</td>
</tr>
<tr>
<td>Hypertension</td>
<td>5</td>
<td>91.20±1.80</td>
<td>87.20±3.90</td>
</tr>
<tr>
<td>Intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prehypertension</td>
<td>7</td>
<td>80.60±1.00</td>
<td>76.30±8.30</td>
</tr>
<tr>
<td>Hypertension</td>
<td>9</td>
<td>92.00±1.70</td>
<td>81.60±3.30</td>
</tr>
</tbody>
</table>

Table 5 showed mean values of blood calcium levels during pre-test and post-test in the intervention and control groups. Based Wilcoxon test, mean of blood calcium levels in the intervention group had increased and statistically significant (p= 0.005<0.05), while blood calcium levels in the control group was increased but not significant, p=0.18>0.05.

Table 5. Calcium levels in blood changes during pre-test and post-test in control and intervention groups

<table>
<thead>
<tr>
<th>Calcium levels in the blood</th>
<th>n</th>
<th>Mean±SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>Control</td>
<td>10</td>
<td>8.60±0.46</td>
<td>8.70±0.50</td>
</tr>
<tr>
<td>Intervention</td>
<td>10</td>
<td>8.50±0.68</td>
<td>9.10±0.60</td>
</tr>
</tbody>
</table>

Table 6 illustrates mean value of pregnancy outcomes in control and intervention groups. The infants were born in the intervention group had higher birth body weight than infants were born in the control group. The statistical test found statistically significant differences in calcium and vitamin D supplement consumption and birth body weight, p= 0.00< 0.05. Similarly, there was significant differences between mean of birth body length and birth head circumference between control and intervention groups.

Table 6. Effect of calcium and vitamin D supplement consumption among pregnant women with hypertension toward pregnancy outcomes at Poasia and Lepo-Lepo Puskesmas, Kendari city

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Mean±SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth body weight (gram)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>2681.30±335.10</td>
<td>0.000</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td>3187.5±303.00</td>
<td></td>
</tr>
<tr>
<td>Birth length (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>46.50±2.00</td>
<td>0.000</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td>49.40±2.20</td>
<td></td>
</tr>
<tr>
<td>Birth head circumference (cm)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>16</td>
<td>31.50±1.50</td>
<td>0.000</td>
</tr>
<tr>
<td>Intervention</td>
<td>16</td>
<td>33.90±1.60</td>
<td></td>
</tr>
</tbody>
</table>
Overall Discussion

The results showed significant difference in systolic blood pressure in both groups. The systolic blood pressure in the intervention group decreased more significantly than control group. Similarly, diastolic blood pressure in both groups was observed decreased after post-test. However, statistically significant decreased only occurred in the intervention group. Furthermore, calcium and vitamin D supplement had significant effect on the respondents who had prehypertension in systolic blood pressure and diastolic blood pressure. The respondents had high systolic blood pressure in pre-test and had observed significantly decreased in systolic blood pressure after post-test. However, lactate calcium and vitamin D supplement did not provide significant differences in systolic blood pressure among respondents had hypertension. In contrast, these supplements had significant effect on reduce diastolic blood pressure among respondent with hypertension. Meanwhile, two studies shown no correlation between vitamin D and hypertension and blood pressure measurement. The calcium had provided in both groups since calcium supplement as one of the health programs in prevent preeclampsia occurrence among pregnant women. The supplement consumption compliances also affected the changes in the blood pressure. The lack of monitoring in the supplement consumption among respondents in the control group lead inconsistency calcium consumption so less perceived for calcium benefits.

Besides, mean of blood calcium levels were increased in both groups. However, increment in blood calcium level was statistically significant only occurred in the intervention group. Many factors affected calcium concentration in the blood such as kidney diseases, hyperparathyroidism, lack of albumin in the blood as well as presence of calcium absorption disorders which affected blood calcium levels. This study had proved sufficient in calcium and vitamin D supplement increased in blood calcium levels. The result also found infants were born in the intervention group had better pregnancy outcomes (birth body weight, birth body length and birth head circumference) than the control group. The LBBW was divided into two group into two groups included prematurity and dysmaturity. De-Regil et al. found women had consumed vitamin D supplement during pregnancy less frequent had infants with less than 2500 grams than women did not consumed vitamin D supplement. Furthermore, infants were born in the intervention group had better birth length than control groups. The mean of birth length among infants were born in the control group still within normal standard birth length about 46.5 cm, while average mean of birth length in the intervention group was 49.4 cm. Meanwhile, better birth head circumference among infants were born in the intervention group than in the control group. The presence of caput succedaneum affected birth head circumference. This result is opposite with the study by Charandabi et al. found vitamin D and calcium-vitamin D supplement consumption during pregnancy did not changes pregnancy outcomes result (birth body weight, birth length and birth head circumference). The fetal organs and skeleton formation in form of collagen matrix started to develop during initial to mid-trimesters and foetus skeleton began to be harden in the last trimester lead high demand of calcium among pregnant women.

The dangers of hypertension in pregnancy was great concern among pregnant women, health workers and government. The calcium supplement provision was under Ministry of Health program through WHO recommendation to prevent hypertension in pregnancy occurrence that lead to preeclampsia which harm to the mother and foetus. Meanwhile, many studies demonstrated women with low vitamin D supplementation had higher risk in preeclampsia occurrence. Currently, there is still lacking in counselling in the importance of nutrient intake (especially calcium) in the pregnancy. Main factor is lack of knowledge about importance in calcium benefits lead pregnant women did not care in calcium consumption provided by the midwives. In fact, the calcium is needed by pregnant women especially in second and third pregnant trimester. The calcium can be obtained from food sources such as green vegetables, grains and nuts, meat, eggs and milk.

Indonesia is a tropical country and sunny all year round. The vitamin D deficiency among Indonesian due to current lifestyle which tend to avoid sunlight, sunscreen protector usage and lack of food consumption which containing vitamin D. In this study, average of respondents were housewives, thus less exposure in the sunlight. In general, the result showed pregnancy outcome for intervention group is better than in control group. Based on these results, there is significant effect of calcium and vitamin D supplement consumption in pregnant women with hypertension toward pregnancy outcomes (birth body weight, birth length and birth head
circumference).

Acknowledgement

The author would like to thank to all respondentsin Poasi and Lepo-Lepo Puskesmas in Kendari city for data input and Faculty of Medicine, Hasanuddin University for unconditionally support.

Conclusion

In conclusions, there was significant decrease in systolic and diastolic blood pressure in the intervention group after calcium and vitamin D supplement consumption. Meanwhile, significant effect of calcium and vitamin D supplement consumption toward pregnancy outcomes in Poasia and Lepo-Lepo Puskesmas, Kendari city. The health worker should provide the counselling to the pregnant women about importance of calcium and vitamin D for hypertension prevention and improve pregnancy outcomes.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


13. Charandabi, SMA, Mirghafourvand, M, Mansouri, A, Najafi, M, Khodabande, F. The effect of vitamin D


Relationship between Night Sleep Quality with Changes in the Infants Body Length of age between one Month and Six Months

Yola Arimbi¹, Sri Saadiyah¹, Mita Noviana¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

The changes in infant body length can be influenced by several factors such as daily behaviour, sleep quality, nutrition intake, environmental conditions and health status. The study aim to determine the relationship between night sleep quality and changes in infant body length of one month until six months. This study was used correlational study with cross sectional approach. The study population was infants who have health examination in Tamalanrea Health Centre with total population of 160 infants. The study samples were 62 infants who met the inclusion criteria. The data was collected included sleep quality by using BISQ questionnaire (A Brief Screening Quisionare For Infant Sleep Problem). The result showed 38 respondents (61.3%) had normal body length with good sleep quality which dominated infant aged one month and 3 months. Meanwhile, 5 respondents (8.1%) had normal body length with poor sleep quality. The statistical test showed significant value p=0.002, r=0.394 and r²= 0.155.

Keywords: Exclusive breastfeeding; Infant; Maternal age; Maternal education level

Introduction

Anthropometric measurement in the neonatal period is important which height, weight and head circumference are usually used measures of growth in neonatal. The anthropometric measurement at birth are measurement used in assessment of peri- and postnatal growth and health. The neonatal is duration that infant adaption in new environment from intrauterine to extrauterine. The infant development is divided into 2 categories included neonates from first day born until 28 days and infants from 29 days until 12 months.

One aspect of infant growth that be concern is infant body length. The changes in infant body length can be indicator for assessing physical growth and comparator for other growth. The changes in body length is affected by several factors such as daily behaviour, nutrition intake, environmental conditions and health status.

The sleep also an adaption toward the environment. In general, the infant spend one-third or half of their life with sleep. As the infant grows up, the sleep duration is decreasing. Meanwhile, number of sleeps also reduced and total sleep duration is ranges between 13 hours and 15 hours for three months until six months old. The infant required long sleep duration than adults because most hormones would release during their sleep period. These hormones has stimulated the tissues and bones for infant growth. In additions, metabolism, nerves development, synapse formation and other development will occur.

The inadequate sleep is correlated with behavioural and learning problems, maternal depression, poor parental functioning and obesity. In western countries, approximately 15% to 35% of infant had sleep disorder for first year including often night waking and unwilling to sleep. Infants with sleep disorders will have experience same disruptions in the future. The preliminary study conducted at Tamalanrea Public Health Centre showed six infants often wake up at night for more than one hour and frequent crying. The study aim to determine the relationship between night sleep quality and changes in infant body length of one month until six months. This study was used correlational study with cross sectional approach.
Methodology

Study design and location

The study was used correlation research design with cross sectional approach. The study was conducted at Tamalanrea Health Centre.

Study population and sample

The study population was infant aged one month until six months who have health examination at Tamalanrea Health Centre with total population of 160 infants. The study samples were 62 infants who met the inclusion criteria.

Data collection

The data was collected by measuring infant sleep quality using A Brief Screening Quisionare for Infant Sleep Problem (BISQ) and infant body length using metered board which interpreted based on objective criteria.

Data analysis

The data was analysed by bivariate analysis technique. Besides, the study also used Spearman to determine the relationship between night sleep quality with changes in infant body length aged of one month until six months.

Results and Discussion

Univariate Analysis

In Table 1, 14 respondents (22.6%) were aged one month and 3 respondents (4.8%) were aged 5 months. Besides, 14 respondents (22.6%) were aged 3 months and 12 respondents (19.4%) were aged 4 months. Meanwhile, 32 respondents (51.6%) were male infants and 30 respondents (48.4%) were female infants. In additions, 46 respondents (74.2%) were in exclusive breastfeeding and 16 respondents (25.8%) were non-exclusive breastfeeding. Meanwhile, there were 25 respondents (40.3%) had completed high school and 21 respondents (33.9%) were completed degree. Besides, 4 respondents (6.5%) were completed associate degrees and 5 respondents (8.1%) were completed elementary school. For maternal age, there were 21 respondents (33.9%) aged between 21 years old and 25 years old and 3 respondents (4.8%) aged between 16 years old and 20 years old. Meanwhile, 18 respondents (29.0%) were aged 26 years old and 30 years old and 12 respondents (19.3%) were aged 31 years old and 35 years old.

In additions, Table 2 shows 48 respondents (77.4%) were good and 14 respondents (22.6%) were poor in night sleep quality. Meanwhile, 43 respondents (69.4%) had normal body length changes and 19 respondents (30.6%) had abnormal in infant body length changes.

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 month</td>
<td>14</td>
<td>22.6</td>
</tr>
<tr>
<td>2 months</td>
<td>10</td>
<td>16.1</td>
</tr>
<tr>
<td>3 months</td>
<td>14</td>
<td>22.6</td>
</tr>
<tr>
<td>4 months</td>
<td>12</td>
<td>19.4</td>
</tr>
<tr>
<td>5 months</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>6 months</td>
<td>9</td>
<td>14.5</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>51.6</td>
</tr>
<tr>
<td>Female</td>
<td>30</td>
<td>48.4</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Exclusive breastfeeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>46</td>
<td>74.2</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>25.8</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Maternal education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>5</td>
<td>8.1</td>
</tr>
<tr>
<td>Middle school</td>
<td>7</td>
<td>11.3</td>
</tr>
<tr>
<td>High school</td>
<td>25</td>
<td>40.3</td>
</tr>
<tr>
<td>Associates degree</td>
<td>4</td>
<td>6.5</td>
</tr>
<tr>
<td>Degree</td>
<td>21</td>
<td>33.9</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Maternal age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-20</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>21-25</td>
<td>21</td>
<td>33.9</td>
</tr>
<tr>
<td>26-30</td>
<td>18</td>
<td>29.0</td>
</tr>
<tr>
<td>31-35</td>
<td>12</td>
<td>19.3</td>
</tr>
<tr>
<td>36-40</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 2. Respondent distribution based on sleep quality with changes in infant body changes

<table>
<thead>
<tr>
<th>Respondent distribution</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>48</td>
<td>77.4</td>
</tr>
<tr>
<td>Poor</td>
<td>14</td>
<td>22.6</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100.0</td>
</tr>
<tr>
<td>Infant body length changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>43</td>
<td>69.4</td>
</tr>
<tr>
<td>Abnormal</td>
<td>19</td>
<td>30.6</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Bivariate analysis**

In Table 3, 38 respondents had good night sleep quality with normal infant body length changes and 5 respondents (8.1%) had poor night sleep quality with normal infant body length changes. Furthermore, 10 respondents (16.1%) had good night sleep quality with abnormal changes in body length and 9 respondents (14.5%) had poor night sleep quality with abnormal changes in body length. The spearman test showed p value= 0.002<0.05, r value was 0.394 and r square value was 0.155 or 15.5%. The statistical test showed significant relationship between night sleep quality and changes in infant body length which sufficient correlation and positive relationship direction. The influence of night sleep quality with changes in infant body length aged one month until six months was 1.55%, while 84.5% is influenced by other factors.

<table>
<thead>
<tr>
<th>Sleep quality</th>
<th>Changes in body length</th>
<th>p-value</th>
<th>r</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Good</td>
<td>38</td>
<td>61.3</td>
<td>10</td>
<td>16.1</td>
</tr>
<tr>
<td>Poor</td>
<td>5</td>
<td>8.1</td>
<td>9</td>
<td>14.5</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>69.4</td>
<td>19</td>
<td>30.6</td>
</tr>
</tbody>
</table>

**Overall Discussion**

In this study, 48 respondents (77.4%) had good sleep quality and 14 respondents (22.6%) had poor sleep quality. The high respondent distribution was dominated by infant aged between one month and 3 months with good sleep quality is influenced by several factors included environment condition, bed condition, exclusive breastfeeding, infant sleep duration either day or night, number infant awake during sleep duration, awake duration on night and duration for initiate infant to sleep.

Most infants had sleep duration between 11 hours and 14 hours in their sleeping life with bedtime distribution of 3 hours to 5 hours from morning until evening and in evening between 9 hours and 10 hours. In additions, most sleep frequencies were between 12 hours and 14 hours per day for infant aged between one month and six months. The study also found infant was awake more than 5 times in their sleeping life and more frequent in the night time because infant need to be breastfeed. The infant would awake for 15 minutes to 30 minutes after sleep and in good mood.

In additions, sleep also helps the infant brain maturation process. High growth hormone level produced during sleep in non REM are closely related physical health number while the blood flow also
increased to the brain during sleep and REM also plays role in mental health as well as brain activity so the brain can grow optimally.

High REM sleep component in the infant is the way of the brain stimulates itself. This stimulation plays an important role in central nervous system growth. During sleep, anabolic state occurred in which energy conservation, repaired body cells and growth. The nutrition or exclusive breastfeeding, genetic and also neuroendocrine factors influenced the infant sleep quality.

Most infants who had good sleep quality and normal changes in the body length with exclusive breastfeeding. Besides, breast milk also plays important role in the infant body length changes because breast milk contains different nutrients from formula milk and other complementary foods.

Furthermore, genetic factors also contributed in the infant body length. The infant with high parent height had greater chance for infants have high body length. The mother with small body size had high chance in giving birth to small infants. In this study, 9 infants (14.5%) had poor sleep quality and abnormal body length changes and influenced by environmental factors are not conductive resulted poor sleep quality. The infants who did not had exclusive breastfeeding have irregular sleep pattern and received insufficient nutrient intake.

Acknowledgement: The author would like to thank to Tamalanrea Health Centre for resources and data input and Faculty of Medicine, Hasanuddin University for unconditionally support.

Conclusion

In conclusion, there was significant relationship between night sleep quality with the changes in infant body length of aged between one month and six months with sufficient correlation and positive relationship. The effect of night sleep quality with changes in infant body length was 15.5%, while 84.5% were influenced by other factors. Further study will be done with other study methods and factors to determine the relationship between night sleep quality with changes in infant body length of aged one month until six months.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

Relationship between Knowledge, Attitude and Motivation among Midwives in the Normal Labour Care Implementation

Yuli Setiawati¹, Andi Wardihan Sinrang¹, Irfan Idris¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia.

Abstract

Approximately, 350,000 women died from pregnancy-related causes every year and majority of maternal mortality occurred in developing countries. The main causes of maternal mortality included eclampsia, postpartum haemorrhage, pregnancy-induced hypertension, obstructed labour, amniotic fluid embolism, obstetric haemorrhage, thromboembolism, anaemia, unsafe abortion, infection, ectopic pregnancy, embolism and anaesthesia complication. The study aimed to determine the relationship between knowledge, attitudes and motivation among midwives in the normal labour care implementation. The study was used an observational research with cross sectional approach. The data collection was conducted from January to February 2016. The study had been done in Sawerigading Palopo Hospital. The study population were all midwives who working in maternity room of Sawerigading Palopo Hospital on October 2015. The sample in this study was entire population of midwives in the maternity room of Sawerigading Palopo Hospital. The sample sizes were 25 respondents which obtained by sampling technique. The data was collected by using questionnaire. The statistical test in knowledge and normal labour care implementation was p=0.98, attitude (p=0.98) and motivation (p=0.174).

Keywords: Attitude; Competence; Knowledge; Midwives; Motivation;

Introduction

Estimation 350,000 women died from pregnancy-related causes every year and majority of maternal mortality occurred in developing countries¹. World Health Organization (WHO) had defined maternal mortality as women death during pregnancy or within 42 days after pregnancy termination, regardless of pregnancy duration and site, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes². According to WHO fact sheet, one third occurred in South Asia and more than half of maternal mortality occurred in sub-Saharan Africa². High risk of maternal mortality among girl adolescent under 15 years old. The maternal mortality rate (MMR) in developed countries (such as Norway, United Kingdom, Sweden) ranged from 5.4 to 12 per 100,000 live births and middle-income countries such Mexico and Honduras had 106 or 280 maternal mortality per 100,000 live births³. The main causes of maternal mortality included eclampsia, postpartum haemorrhage, pregnancy-induced hypertension, obstructed labour, amniotic fluid embolism, obstetric haemorrhage, thromboembolism, anaemia, unsafe abortion, infection, ectopic pregnancy, embolism and anaesthesia complication⁴-⁶.

Midwives was primary care providers included gynecologic, family planning, preconception care, care during pregnancy, childbirth, postpartum period, normal new born during first 28 days of life and sexually transmitted infections treatment in male partners. In New Zealand, midwives are provided midwifery care through pregnancy, childbirth, birth and postpartum period up to six weeks for women who had booked midwifery services⁷. Sawerigading Palopo hospital was referral hospital in Palopo city was practical hospital for midwives who participated in reproductive health training which organized by Health Office of South Sulawesi province in collaboration with Palopo city Health office. In Sawerigading Palopo Hospital, 25 midwives were on duty and 2 midwives had positions as Head of Midwifery and Vice Head of Midwifery in...
the maternity room of Sawerigading Palopo Hospital. The study aimed to determine relationship between knowledge, attitudes and motivation among midwives in the normal labour care implementation.

Methodology

Study design

The study was used an observational research with cross sectional approach to analyse the relationship between knowledge, attitude and motivation among midwives on normal labour care.

Study location and time

The data collection was conducted from January to February 2016. The study had been done in Sawerigading Palopo Hospital.

Study population and sample

The study population were all midwives who working in maternity room of Sawerigading Palopo Hospital on October 2015. The sample in this study was entire population of midwives in the maternity room of Sawerigading Palopo Hospital. The sample sizes were 25 respondents which obtained by sampling technique.

Data analysis

The data was collected by using questionnaire. The univariate analysis aims to determine frequency distribution of each study variable. The bivariate analysis is represented to determine influence between knowledge, attitudes and motivation among midwives in normal labour care implementation by using chi square test. The data were tabulated and analysed using computerized technique.

Results and Discussion

Univariate Analysis

Based on Table 1, 23 respondents (92%) were in reproductive age between 20 years and 35 years and 2 respondents (8%) were non-reproductive age which aged more than 35 years. Meanwhile, 15 respondents (60.00%) had diploma III and 10 respondents (40%) had diploma IV. There were 22 respondents (88%) were worked less than 10 years and 3 respondents (12%) had worked more than 10 years.

In Table 2, there were 14 respondents (56%) had poor knowledge in the normal labour care and 11 respondents (44%) had good knowledge in normal labour care. Meanwhile, Table 3 shows 11 respondents (44%) had positive attitudes in normal labour care and 14 respondents (56%) were negative attitudes in normal labour care implementation.

### Table 1. Respondent characteristic in Sawerigading Palopo Hospital

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reproductive age (20-35 years)</td>
<td>23</td>
<td>92</td>
</tr>
<tr>
<td>Non-reproductive age (&gt;35 years)</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma III</td>
<td>15</td>
<td>60.00</td>
</tr>
<tr>
<td>Diploma IV</td>
<td>10</td>
<td>40.00</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>100</td>
</tr>
<tr>
<td>Service year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10 years</td>
<td>22</td>
<td>88.00</td>
</tr>
<tr>
<td>&gt;10 years</td>
<td>3</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 2. Frequency distribution of respondents based on knowledge in normal labour care

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>11</td>
<td>44.00</td>
</tr>
<tr>
<td>Poor</td>
<td>14</td>
<td>56.00</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 3. Frequency distribution of respondents based on attitudes in normal labour care

<table>
<thead>
<tr>
<th>Attitudes</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>11</td>
<td>44.00</td>
</tr>
<tr>
<td>Negative</td>
<td>14</td>
<td>56.00</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>
Based on Table 4, 18 respondents (72%) had good motivation in normal labour care implementation and 7 respondents (28%) had poor motivation in normal labour care implementation. There were 16 respondents (64%) had competence in normal labour care implementation and 9 respondents (36%) were non-competence in normal labour care implementation.

### Table 4. Frequency distribution of respondents based on motivation in normal labour care

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>18</td>
<td>72.00</td>
</tr>
<tr>
<td>Poor</td>
<td>7</td>
<td>28.00</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 5. Frequency distribution of respondents based on normal labour care implementation

<table>
<thead>
<tr>
<th>Normal labour care implementation</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competence</td>
<td>16</td>
<td>64.00</td>
</tr>
<tr>
<td>Non-competence</td>
<td>9</td>
<td>36.00</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

### Bivariate Analysis

There were 5 respondents (45.5%) were competence in normal labour care implementation had good knowledge while 11 respondents (78.6%) had poor knowledge. The statistical test showed there was no significant relationship between knowledge in normal labour care implementation.

### Table 6. Relationship between knowledge, attitudes and motivation among midwives in normal labour care implementation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Normal labour care implementation</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Competence</td>
<td>Non-competence</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>5</td>
<td>45.5</td>
<td>6</td>
</tr>
<tr>
<td>Poor</td>
<td>11</td>
<td>78.6</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>Attitudes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>5</td>
<td>45.5</td>
<td>6</td>
</tr>
<tr>
<td>Negative</td>
<td>11</td>
<td>78.6</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>9</td>
<td>25</td>
</tr>
<tr>
<td>Motivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>10</td>
<td>55.6</td>
<td>8</td>
</tr>
<tr>
<td>Poor</td>
<td>6</td>
<td>85.7</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>9</td>
<td>25</td>
</tr>
</tbody>
</table>
Meanwhile, 6 respondents (54.5%) were non-competence in normal labour care implementation had positive attitude and 3 respondents had negative attitudes in normal labour care implementation. There were 10 respondents (55.6%) were competence in normal labour care implementation which had good motivation and 6 respondents (85.7%) had poor motivation. There was no significant relationship between attitudes and motivation toward normal labour care implementation.

**Overall Discussion**

The knowledge is very important domain for worker performance. Based on this study, 11 respondents (44%) had good knowledge and 5 respondents (45.5%) were competence in normal labour care implementation and 6 respondents (54.5%) were non-competence in normal labour care implementation. The statistical test found no significant relationship between knowledge and normal labour care implementation. The midwives had good knowledge since midwife had been trained in normal labour care. The midwives claim their long service period in the maternity ward, so midwives had less in apply their knowledge optimally because their experience in childbirth process. Meanwhile, midwives who did not applied their knowledge in their normal labour care since midwives did not aware the training had provided knowledge in the normal labour care implementation.

Attitudes is defined as attitude as neural state or mental of readiness, organized through experience, exerting a directive or dynamic influence on the individual’s response to all objects and situations to which it is related. The statistical test found no significant relationship between attitudes toward normal labour care implementation. The junior midwives had adapted attitudes which practice by senior midwives in ignoring normal labour care implementation. Hettiarachchi et al. mentioned positive job attitudes contributed in constructive behaviour; negative jobs had contributed in figure out undesirable behaviours.

Besides, no significant relationship between motivation and normal labour care implementation. The lack of support from hospital management also contributed in midwives motivation in implemented normal labour care implementation. The continually training in normal labour care also improve motivation and performance among midwives. The training helped midwives to gain their effectiveness in their work performance through development of their habit, mind, actions, skills, knowledge and attitude. In additions, incentives also influenced performance of midwives. The incentives had increased midwives motivation and productivity on providing health service to the patients. The incentives in term of financial and non-financial are among extrinsic factors motivation which improved midwives performance to provided good of health service quality. In Cameroon, Iwoi et al. found midwifery students had moderate level of knowledge in HIV/AIDS and positive attitudes but some of respondents still have misconceptions and unwillingness about HIV/AIDS patient. The sufficient training, adequate equipment and higher wages also contributed in motivation among midwives in implemented normal labour care.

**Acknowledgement:** The author would like to thank to all midwives who working in maternity room of Sawerigading Palopo Hospital for resources and data input together with Faculty of Medicine, Hasanuddin University for unconditionally support.

**Conclusion**

In conclusions, no significant relationship between knowledge, attitudes and motivation among midwives toward normal labour care implementation in maternity room of Sawerigading Palopo Hospital.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Four Pillars Control of Blood Glucose Levels on the Patients with Diabetes Mellitus Type 2 in Ponre Village Bulukumba District

Yuyun Ariska¹, H. Ridwan A¹, Indra Dwinata¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

Type 2 diabetes mellitus (DM) can be regarded as one of chronic metabolic disorder in which number of patients has been increasing steadily all over the world for the past few years. The aim of this study is to determine the relationship between four pillars control toward blood glucose levels on patients with diabetes mellitus (DM) type II. The study type was analytic survey with cross sectional study approach. This study was conducted in January until February 2016 in Ponre public health centre (Puskesmas) working area in Bulukumba district. The population in this study were all patients with DM type II. The sample sizes were 82 respondents by using simple random sampling method. It can be concluded that there was significant relationship between knowledge (p=0.000), dietary habits (sugary, fatty and fibre food consumption) (p=0.000) and physical activity (p= 0.000). Meanwhile, no significant relationship between oral hypoglycemic drug consumption compliance to blood glucose levels (p= 0.000).

Keywords: blood glucose level; diabetes mellitus; four pillars; Puskesmas

Introduction

Diabetes mellitus (DM) type II is defined as metabolic disorder which caused by evolution of insulin resistance and abnormal of pancreatic beta cell function¹. An estimation of 366 million people aged between 20 years and 79 years had DM type II in worldwide². There are 85% to 95% of all diabetes had recorded in high income countries and DM type II is more dominated in developing countries³. Several causes contributed in DM type II such as gender, age, dietary habit, obesity, lack of sleep and nutritional supplement during maternal pregnancy⁴.

DM prevalence in Indonesia is estimated increased from 8.4 million to 21.3 million between 2000 and 2030. Indonesia is among highest of DM prevalence worldwide after India, China, United States and Pakistan⁵. The DM prevalence in South Sulawesi had reached 4.6%⁶. In 2008, DM was in fourth ranked of noncommunicable diseases (NCDs), 6.65% and contributed in fifth ranked caused death, 6.28%). Meanwhile, DM was main cause of mortality in South Sulawesi which is equivalence to 41.56%⁷. In Makassar city, there were 14,604 patients for DM disease in 2013. The objective for this study is to determine relationship between four pillars control toward blood glucose levels on patients with diabetes mellitus (DM) type II.

Methodology

Study Type: This study was used observational analytic observational with cross sectional study design.

Location and Time : This study was conducted from December 2015 to March 2016 at Puskesmas Ponre working area in Bulukumb district.

Population and sample: The population in this study were all patients with DM type II. The sample sizes were 82 respondents by using simple random sampling method.

Data Collection: The primary data was obtained through questionnaires and secondary data was determined from Puskesmas Ponre working area in form of DM data.
Data Analysis

The data was analyzed using SPSS program. The bivariate analysis was obtained to determine relationship between dependent and independent variables in form of cross tabulation with chi-square test.

Result and Discussion

Bivariate Analysis

Based on Table 1, 35 respondents (42.7%) had uncontrolled on blood glucose levels among DM type II patients, 28 respondents (66.7%) had lack of knowledge and 7 respondents (17.5%) had high knowledge. There were 14 respondents (33.3%) had lack of knowledge and 33 respondents (82.5%) had high knowledge for respondents with control in blood glucose levels. Based on chi square test analysis, there was a significant relationship between knowledge with blood glucose levels on DM type II patients at Puskesmas Ponre in Bulukumba district.

### Table 1. Relationship between knowledge toward blood glucose levels on diabetes mellitus type II patients at Puskesmas Ponre, Bulukumba district

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Blood glucose levels control</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>Yes</td>
</tr>
<tr>
<td>Less</td>
<td>28</td>
<td>66.7</td>
<td>14</td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>17.5</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>42.7</td>
<td>47</td>
</tr>
</tbody>
</table>

There were 33 respondents (71.7%) had consumed frequent sweet food and 2 respondents (5.6%) had rarely consumed sweet food with uncontrolled blood glucose levels. Meanwhile, 13 respondents (28.3%) had frequent sweet food consumption and 34 respondents (94.4%) had rarely sweet food consumption for respondents with controlled blood glucose levels. There was a significant relationship between sweet food consumption with blood glucose levels as shown in Table 2.

### Table 2. Relationship between sweet food consumption toward blood glucose levels on diabetes mellitus type II patients at Puskesmas Ponre, Bulukumba district

<table>
<thead>
<tr>
<th>Sweet food consumption</th>
<th>Blood glucose levels control</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>Yes</td>
</tr>
<tr>
<td>Frequent</td>
<td>33</td>
<td>71.7</td>
<td>13</td>
</tr>
<tr>
<td>Rarely</td>
<td>2</td>
<td>5.6</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>42.7</td>
<td>47</td>
</tr>
</tbody>
</table>

Based on Table 3, 35 respondents (154.7%) had frequent fatty food consumption with uncontrolled blood glucose levels. There were 29 respondents (45.3%) had frequent fatty food consumption and 18 respondents (100.0%) had rarely fatty food consumption without controlled blood glucose levels. Based on chi-
square test, there was significant relationship between fatty food consumption and blood glucose levels. As for sweet and fatty food category, 33 respondents (73.3%) had frequent consumptions while 2 respondents (5.4%) had rarely sweet and fatty food consumptions with uncontrolled blood glucose levels. In additions, 12 respondents (26.7%) had frequent sweet and fatty food consumptions and 35 respondents (94.6%) had rarely sweet and fatty consumptions with controlled blood glucose levels. There was a significant relationship between sweet and fatty food consumptions with blood glucose levels.

Table 3. Relationship between fatty food and sweet plus fatty food consumption towards blood glucose levels on diabetes mellitus type II patients at Puskesmas Ponre, Bulukumba district

<table>
<thead>
<tr>
<th>Types of food</th>
<th>Consumption</th>
<th>Blood glucose levels control</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Fatty food</td>
<td>Frequent</td>
<td>35</td>
<td>54.7</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td>42.7</td>
</tr>
<tr>
<td>Sweet and fatty food</td>
<td>Frequent</td>
<td>33</td>
<td>73.3</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td>42.7</td>
</tr>
</tbody>
</table>

As shown in Table 4 in terms of vegetables consumption, 12 respondents (85.7%) had rarely fibre consumption and 23 respondents (33.8%) had frequent fibre in vegetable consumption with uncontrolled blood glucose levels. There were 2 respondents (14.3%) had rarely fibre in vegetables consumption and 45 respondents (66.2%) had frequent in fibre in vegetables consumption with controlled blood glucose levels. Based on chi-square test, there was significant relationship between fibre in vegetables consumption and blood glucose levels on DM type II patients at Puskesmas Ponre.

As for fruit consumption, 22 respondents (78.7%) had rarely with fibre in fruit consumption and 13 respondents (24.1%) had frequent with fibre in fruit consumption with uncontrolled blood glucose levels. Meanwhile, 6 respondents (21.4%) had frequent fibre in fruit consumption and 41 respondents (75.9%) had rarely fibre in fruit consumption with controlled blood glucose levels.

Table 4. Relationship between fibre in vegetables and fruits consumption toward blood glucose levels on diabetes mellitus type II patients

<table>
<thead>
<tr>
<th>Types of food</th>
<th>Consumption</th>
<th>Blood glucose levels control</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Fibre in vegetables</td>
<td>Rarely</td>
<td>12</td>
<td>85.7</td>
</tr>
<tr>
<td></td>
<td>Frequent</td>
<td>23</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35</td>
<td>42.7</td>
</tr>
</tbody>
</table>
Cont... Table 4. Relationship between fibre in vegetables and fruits consumption toward blood glucose levels on diabetes mellitus type II patients

<table>
<thead>
<tr>
<th>Fibre in fruits</th>
<th>Rarely</th>
<th>Frequent</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Rarely</td>
<td>22</td>
<td>78.7</td>
<td>6</td>
<td>21.4</td>
</tr>
<tr>
<td>Frequent</td>
<td>13</td>
<td>24.1</td>
<td>41</td>
<td>75.3</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>42.7</td>
<td>47</td>
<td>57.3</td>
</tr>
</tbody>
</table>

Based on Table 5, 25 respondents (96.2%) had lack of physical activities and 10 respondents (30.3%) had medium physical activities for respondents with uncontrolled blood glucose levels. Meanwhile, 23 respondents (69.7%) had medium physical activities and only 1 respondent (3.8%) had low physical activities for respondents with controlled blood glucose levels. There was a significant relationship between physical activities and blood glucose levels on DM type II patients at Puskesmas Ponre. Based on Table 6, 35 respondents (54.7%) were noncompliance patients with uncontrolled blood glucose levels. Besides, 29 respondents (45.3%) were noncompliance and 18 respondents (100.0%) were compliance without controlled blood glucose levels. Based on chi-square test, there was non-significant relationship between oral hypoglycaemic drug consumption compliance and blood glucose levels.

Table 5. Relationship between physical activities toward blood glucose levels on diabetes mellitus type II patients

<table>
<thead>
<tr>
<th>Physical activities</th>
<th>Blood glucose levels control</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Low</td>
<td>25</td>
<td>96.2</td>
</tr>
<tr>
<td>Medium</td>
<td>10</td>
<td>30.3</td>
</tr>
<tr>
<td>High</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>42.7</td>
</tr>
</tbody>
</table>

Table 6. Relationship between oral hypoglycaemic drug consumption compliance toward blood glucose levels on diabetes mellitus type II patients

<table>
<thead>
<tr>
<th>Compliance</th>
<th>Blood glucose levels control</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>No</td>
<td>35</td>
<td>54.7</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>42.7</td>
</tr>
</tbody>
</table>

Overall Discussion

The result found significant relationship between knowledge and blood glucose level on DM type II patients. A study found significant relationship between dietary habits (sweet, fatty and fibre food consumptions) also showed significant related on blood glucose levels in DM type II patients in H. Adam Malik Medan Hospital. The knowledge was related to literary rates, household income, and self-care. Besides, dietary habits (sweet, fatty and fibre food consumptions) also showed significant related on blood glucose levels.
glucose levels among DM type II patients in Puskesmas Ponre. The glucose tolerance and sensitivity of insulin had influenced by quantity and quality of fat dietary\(^\text{10}\).

Furthermore, a study found high carbohydrate and low in fatty food with limitation of physical activities lead to overweight, obesity and other diabetes complications among Sri Lankan diabetes patients\(^\text{11}\). The fruit and vegetables are important in healthy diet and sufficient daily intake helped in prevent non-communicable diseases such as cardiovascular diseases, cancers and DM itself\(^\text{12}\). In additions, this study found some DM patients had frequently consumed vegetable but the blood glucose level still uncontrolled due to decreased in vegetable quality. The physical activities are all form of body movement activities such as cardiorespiratory fitness, exercise and physical fitness. The study found the physical activities is associated with blood glucose levels. A few studies had found benefit effect on regular physical activities on carbohydrate and insulation effect\(^\text{12}\). An estimation of 20%-30% of diabetes patients suggested light-intensity daily physical activity had reduced mortality in diabetic patients\(^\text{13}\).

There was no significant relationship between oral hypoglycaemic drug consumption compliance and blood glucose levels. Most respondents are compliance to consume oral hypoglycaemic drug had uncontrolled blood glucose levels and vice versa. Several factors had influenced in drug consumption compliance included age, social, education, knowledge on long-term treatment, psychological factors, medical treatment complexity, medical cost and treatment side effects. A study showed noncompliance DM type II patients had high 8.6 times of blood glucose levels than compliance DM type II patients for oral hypoglycaemic drug consumption\(^\text{14}\).

**Conclusion**

In conclusions, there was significant relationship between knowledge, dietary habits (sugary, fatty and fibre food consumption) and physical activity. Besides, there was no significant relationship between oral hypoglycaemic drug consumption compliance to blood glucose levels.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Social Determinants of Incidence of Maternal Deaths in Kabupaten Jeneponto in Year 2016

Abdul Rahman Akmal¹, Ridwan M. Thaha¹, Amran Razak¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Sulawesi Selatan 90245, Indonesia

Abstract

Maternal death is one of the major challenges to global health system and is common in developing countries, especially in some backward villages which have inadequate health facilities. The aims of the research were to describe the social health determinants of the incidence of maternal deaths in Kabupaten Jeneponto 2016. This research was a qualitative research with an in-depth interview method with case studies approach. The research informants were 3 close relatives who accompanied the patients and were willing to be interviewed. Informants of this study were identified with snowball technique. Data were analysed with the content analysis method. The results of the study indicated that the incidence of maternal death in Tamalatea clinic was mostly caused by the disease complication, although the patients were always checked for her pregnancy and childbirth at health facilities and by existing midwife in their regions. Presence of other diseases was also the companion case to the risks of maternal death.

Keywords: Complications; Maternal mortality; Nutritional intake.

Introduction

Social determinants of health and behaviour influence the mortality and morbidity in a community. The relationship between the social determinants of health and health behaviour of mortality is an interesting topic to be analysed as mortality is one of three demographic components other than fertility and migration, which affects the number, structure and composition of a population. Social determinants and behaviours developed in the community by the government they provide public services, and health care facilities¹.

Maternal death is one of the global health problems and is common in developing countries. Maternal mortality, child mortality including infant mortality and life expectancy at birth has been established as indicators of health status in healthy Indonesia 2010. Maternal death is a complex issue that not only affects women only, but also affects families and even the surrounding community².

Maternal death continues to be a major challenge to the global health system. The greatest proportion of deaths is caused by obstetric haemorrhage, during or after childbirth, followed by eclampsia, sepsis, unsafe and indirect abortion complications, violence against women, malaria and HIV. Maternal health status affecting maternal mortality includes nutritional status, anaemia, maternal illness, and history of complications in pregnancy and delivery³.

Research conducted in the United States shows that maternal mortality will increase 4-fold in pregnant women at age 35-39 years when compared to women who are pregnant at the age of 20-24 years. The most secure pregnancy age for childbirth is age 20-30 years⁴. The Fifth Annual State of the World’s Mothers Report, published by The International Charity Save The Children, reports that annually, 13 million babies are born by women <20 years of age, and 90% of births occur in developing countries. These women have a risk of maternal deaths due to pregnancy and birth two to five times higher than women aged 20-34 years⁵.
times higher when compared to older women.

However, maternal mortality rate in Jeneponto is reported to be high is due to the low midwives’ competence in the villages, inadequate health facilities, geographical location causing delays in delivery assistance, socio-cultural factors and lack of cross-sectoral cooperation. Based on the profile of Jeneponto district health office, the number of maternal deaths in Jeneponto Regency in the last 5 years has increased from 6 people in the 2010 to 11 people in the year of 2015.

Thus, in this work, the authors have examined the determinant of social health to the incidence of maternal mortality in Jeneponto Regency for the Year 2016. This study was conducted qualitatively with in-depth interview method used in to investigate the cause of maternal death in the region.

Methodology

Research Type

The research design used is qualitative with a case study approach. Research strategy here will include observation, in-depth interview, or in-depth interview and documentation in obtaining research results on the social determinant of maternal mortality in Jeneponto District.

Location and Time of Study

This research was conducted for 2 months starting from March 2016 through April 2016. This research was conducted in Tamalatea Health Center area of Tamalatea Subdistrict of Jeneponto Regency, considering the number of pregnant women as much as 674 people in December 2015 and the incidence of maternal death as many as 3 people in most health centers in Jeneponto Regency 2015. Site selection is done based on data obtained through preliminary observations. The implementation of this research was conducted in Bontotangnga, Bontojai and Borongtala villages.

Population and Sample

Purposive Sampling method was used for selecting the informant for this study. Informants in this study were the closest relatives in which 1 sister case, 1 case husband, and 2 persons consisted of 1 case mother and 1 cousin case.

Data Collection

The primary data for this work was collected through in-depth interview and observation. The data collection was done through a retrospective time approach based on the incident case that already occurred. Secondary data was collected from obtained from Puskesmas research location related to mother’s death identity, residence address and the patient’s family. The source triangulation technique was used to ensure the degree of confidence of the data.

Data Processing and Data Analysis

Data obtained from in-depth interviews were analysed using the content analysis method. Data processing research conducted with the following stages.

1. Collecting data through in-depth interview using documentation tools such as recorder, pen and interview guide.

2. Data obtained through in-depth interviews then made in the form of narrative, then classified according to the dimensions of research.

3. Data obtained from informants without intervention researchers presented in the form of narrative text.

Research Ethics

This study was conducted after obtaining permission from University Hasanuddin and Jeneponto Regency Government. In addition consent of the informants was attained before proceeding to the interview session for data collection. All research informants were treated equally.

Result and Discussion

Data collection was conducted from 01 March until March 31, 2016, and the information about maternal deaths that exist in the work area Puskesmas Tamalatea district Jeneponto 2015 was obtained. Table 1 shows the information of the maternal death cases that were investigated.
Table 1. Information of the maternal death cases

<table>
<thead>
<tr>
<th>No</th>
<th>Case Code</th>
<th>Age</th>
<th>Address</th>
<th>Date of death</th>
<th>Place of Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CR</td>
<td>17</td>
<td>Manjangloe</td>
<td>28 Feb 2016</td>
<td>On the way to Hospital</td>
</tr>
<tr>
<td>2</td>
<td>IR</td>
<td>27</td>
<td>Bontojai</td>
<td>3 June 2016</td>
<td>Hospital Lab Baji</td>
</tr>
<tr>
<td>3</td>
<td>NA</td>
<td>30</td>
<td>KarampaPa’ja</td>
<td>12 Nov 2016</td>
<td>Hospital Lanto dg Pasewang</td>
</tr>
</tbody>
</table>

**Death Case: CR**

For the case of CR, during in her pregnancy condition, CR has always visited health facility, taken the medication given by midwife, consumed milk and had enough rest. However, at the time of delivery she experienced eclampsia as her husband was not around during delivery. Thus this has caused high stress situation to CR which increased her blood pressure and caused seizures. Thus, the medical assistant responded to eclampsia by inserting MgSO4 injection into case fluid but the patient’s condition became more severe and finally the officer recommends the patient to be transferred to be referred to the hospital Lanto dg Pasewang immediately. However, the patient passed away while on the way to the hospital.

Reports from the WHO on maternal deaths find that the main causes of maternal mortality include bleeding, eclampsia and infection. Maternal death is a complex event caused by various causes that can be distinguished upon the determinants of near, intermediate, and distant. Close determinants that are directly related to maternal death are obstetric disorders such as bleeding, preeclampsy, and infections or illnesses suffered by women before or during pregnancy which can worsen pregnancy conditions such as heart, malaria, tuberculosis, and kidney. Close determinants are directly influenced by the determinants between health-related factors, such as maternal health status, reproductive status, access to health care, and health facility usage behaviour.

Determinants are much related to demographic and sociocultural factors. Low public awareness about maternal health, poor women’s empowerment, educational background, family socioeconomic, community and political environment, and indirect policy allegedly contributed to increased maternal mortality.

Ansariadi’s research stated that the direct cause pattern of maternal death in South Sulawesi has changed during 2008-2013. In 2008 the majority of maternal deaths were due to bleeding (62%) and hypertension during pregnancy (16%), whereas in 2013 mortality due to hypertension became the main cause of maternal mortality is 38%, while bleeding was second at 30%. In addition, there are variations in the cause of maternal deaths district level, such as changes in patterns of maternal death from bleeding to hypertension (preeclampsia).

Several factors that potentially increase the prevalence of preeclampsia / eclampsia are first pregnancy (primigravida), prior pregnancy history (kidney disease and high blood pressure), and pregnancy with increasing uterine strain (pregnant with most amniotic fluid, multiple pregnancy, and fetal pregnancy big). Observation of the prevalence of preeclampsia / eclampsia in the case group found the majority of pregnant samples at age> 35 at risk.

In the case of preeclampsia occurrence, spasm of blood vessels accompanied by salt and water retention takes place, causing growth disorders. In severe preeclampsia and eclampsia conditions there is a pathological deterioration in the function of some organs and systems in the body, due to vasospasm and ischemia. High protein affects the mother’s ability to repair the damage in her blood vessels, as the vascular build-up increases, the blood pressure rises. The fetus produced high protein due to the difficulty of attaining food.

Preeclampsia / eclampsia is more common at younger ages and nulliparas are thought to be due to an immunologic mechanism in addition to endocrine and genetic; and in the first hundreds of blocking antibodies to placenta antigen have not been perfect, which is more perfect in subsequent pregnancies. Research by Radjamuda and Montolalu states there is a relationship of age and parity with the occurrence of hypertension in
pregnancy (preeclampsia).

**Death Case: Na**

For the case of NA, she has passed away due to bleeding and delayed referral into the hospital by her family members. The most dominant type of bleeding occurs is uterine atony which is theoretically associated with anaemia during pregnancy. However, the prevalence of anaemia is unknown because not all samples tested haemoglobin during pregnancy. Atonea uteri can also be caused by handling of the third stage of labor is wrong, by massaging and pushing the uterus downward to give birth to the placenta. Therefore, competent labor is absolutely necessary to ensure safe delivery.

Postpartum haemorrhage is caused by anaemia during pregnancy. Every pregnant woman with anaemia has a risk for postpartum haemorrhage. One of the causes of postpartum haemorrhage is uterine atony, is the inability of the uterus to contract properly. In anaemia the effective amount of red blood cells is reduced. This affects the amount of haemoglobin in the blood. Lack of haemoglobin levels causes the amount of oxygen tied in the blood is also small, thus reducing the amount of oxygen delivery to vital organs.

One of the causes of death of pregnant women in Tamalatea Health Center is caused by malnutrition and lack of caloric energy (KEK). The pregnant women have anaemia because they do not consume the Fe tablets according to the prescription. Lack of adherence by pregnant women in taking iron tablets is related to their behaviour. Human behaviour is a reflection of some psychiatric symptoms influenced by experience factors, beliefs, means, physical, socio-cultural society. In addition, Socio-economic and cultural problems may be the cause of inadequate iron fulfilment, and gender equality issues also have an effect on the fulfilment of nutrients. Thus, pregnant woman whom have anaemia have the health risk and are prone to medical conditions during childbirth such as heavy bleeding which may cause mortality. The presence of labor complications, especially postpartum haemorrhage, contributes 25% to the occurrence of maternal death. This bleeding will cause the mother to lose a lot of blood, and will result in maternal death in a short time.

**Death Case: IR**

For the case of IR, her death was due to birth complication and was delayed to a health facility. Maternal health status affecting maternal mortality includes nutritional status, anaemia, maternal illness, and history of complications in pregnancy and delivery. The cause of maternal mortality can also be caused by the delay in referral to a health care facility. This condition is seen in cases of NR, where NR was treated at home for a week, and only was referred as the health conditions worsen.

The results of the Aeni’s study, in Pati regency of Central Java stated that the three most common causes of maternal mortality were pregnancy complication, birth complication and disease history. One of the causes of maternal mortality in the area Puskesmas Tamalatea is due to unavailability of health facilities in the form of completeness as doctors are not available during the time of patient’s referral.

Associated with the availability of facilities for early detection of comorbid diseases, generally Poskesdes which became a place of pregnancy check has not had complete facilities such as Puskesmas. The absence of pelvic floor tools, doppler and laboratory testing tools are Hemometer, urine protein and urine reduction in PKD facilities. Laboratory tests such as those conducted at the main health center. The condition of the facility has an impact on the quality of antenatal services provided. With limited facilities, the village midwife in the village health center needs a more complete examination to the primary health center. The availability of facilities will support the successful implementation of antenatal care according to the standard of midwifery services. If the mother needs laboratory examination then the mother will be referred to the Puskesmas.

The results of this study are in accordance with the research of Azizah and Nugrahen in the holy district which states that some midwives do not have complete pregnancy examination facilities such as hammer reflex, hemometer, pelvic length, urine protein and urine reduction because these facilities are mostly located at the primary health center, while they work a lot at village health posts.

**Overall Discussion**

Based on the interview results, the three cases of pregnant mothers who have died have always visited health facilities to check the condition of pregnancy accompanied by the close family or their husband.
Maternal deaths occurred only more due to a history of disease, bleeding factors and eclampsia. Reports from the WHO on maternal deaths found that the main causes of maternal deaths include bleeding, eclampsia and infection. Maternal death is a complex event caused by various distinguishable causes of the near, intermediate, and distant determinants. Close determinants that are directly related to maternal death are obstetric disorders such as bleeding, preeclampsia / eclampsia, and infections or illnesses suffered by women before or during pregnancy which can worsen pregnancy conditions such as heart, malaria, tuberculosis, and kidney. Close determinants are directly influenced by the determinants between health-related factors, such as maternal health status, reproductive status, access to health care, and the use of health facilities.

In addition, there are determinants which are related to demographic and sociocultural factors. Low public awareness about maternal health, poor women’s empowerment, educational background, family socioeconomic, community and political environment, and indirect policy allegedly played a role in increasing maternal mortality.

Although Say reported that the direct cause of maternal deaths globally is still caused by haemorrhage, hypertension and infection, Khan reported that there are differences in patterns of cause of death in various regions. For example Asia and Africa have the same pattern of primary bleeding and eclampsia, but in Latin America, hypertension is the leading cause of maternal mortality whereas in developed countries, maternal mortality is caused by abortion. This information demonstrates the need for cause-based death analysis, as there are likely causes in each region to differ. This study was supported by the results of Ansariadi’s study, the pattern of the direct cause of maternal mortality changes over the past five years. In 2008, more than half of maternal deaths were caused by bleeding, followed by infection and only a small percentage died of eclampsia. The proportion of maternal deaths due to eclampsia has increased from 2009 to 2013. In contrast, the proportion of maternal deaths due to bleeding has decreased. In 2013, only 30% of maternal deaths are caused by eclampsia.

In accordance with research conducted by Alkema, it is reported that mothers to die due to unavailability of personnel and adequate health facilities when there are complications of childbirth. The causes of such problems are not solely derived from the community, but are also affected by the health resources themselves.

Thus, in this work, the three cases of mothers who died always visit health facilities to check the condition of pregnancy accompanied by the close family or her husband as well as no relationship between antenatal care visits and maternal mortality. Maternal deaths are more due to a history of disease, bleeding factors and eclampsia.

Conclusion

Based on the discussion of the social determinant of maternal mortality in Jeneponto District, the authors can draw the conclusion that, CR died of eclampsia and late referenced. NA passed away due to bleeding and late referral as the family refused for an early referral and assumed the bleeding is in normal (cultural) labor. IR died due birth complications and late delivery to health facilities.

Acknowledgment: The author extends the appreciation to Jeneponto Regency Government for the permission and the Faculty of Public Health, University Hasanuddin for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


15. Ansariadi A. Childbirth decisions and outcomes in South Sulawesi Province, Indonesia (Doctoral dissertation, Monash University. Faculty of Medicine, Nursing and Health Sciences. School of Psychology and Psychiatry/Social Sciences and Health Research Unit). 2014.


Factors Affecting the Success Early Initiation of Breastfeeding (EIBF) at Puskesmas Jumpandang Baru 2014

Adryani Mujur¹, Suryani As’ad¹, Irfan Idris¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245.
Sulawesi Selatan, Indonesia

Abstract

Breast milk provides antibody and contains all the nutrients the newborn baby needs for the first six months. Although breastfeeding is a matter of personal preference, family support is a factor that is important in the practice of early initiation of breastfeeding (EIBF), in addition to internal factors, knowledge, attitudes, experiences and perceptions of mothers and external factors, health facilities and personnel birth attendant. This study aims to determine the relationship of successful factors in early initiation of breastfeeding at Puskesmas Jumpandang Baru. This study was quantitative research with a cross-sectional design. There were 80 sample cases of mothers who did early initiation breastfeeding. Data were analyzed using chi square. The research result indicate that there is no significant relation between birth weight, maternal age, parity, education, mother’s knowledge as well as mother’s ANC frequency and the successfulness of EIB. Whereas, there is a significant relationship between midwife’s knowledge (p=0.01) and the midwife’s attitude (p=0.00) with the success of early breastfeeding initiation.

Keywords: Birth weight; breastfeeding initiation; knowledge; midwives; parity.

Introduction

Implementation of EIBF can save 22% of babies who die before a month old. To achieve this goal, one of the things the government is doing is promoting EIBF. This effort was carried out to support the success of the exclusive breastfeeding program.

Nakao et al⁴ stated that the success of exclusive breastfeeding for up to 6 months was associated with EIBF within the first 2 hours of baby’s life and UNICEF in the WHO article wrote that 30,000 babies who usually died during the first month of birth could be saved by EIBF after the first hour of birth. The results of the study by Bakker et al⁵, in Bolivia and Madagascar, a quarter to half of infant’s deaths in developing countries occurs in the first week of life. According to research by Dashtidia et al⁶, in Middle Eastern countries only 6% of mothers breastfeed in the first 5 hours of birth, 71.6% after 36 hours after birth and 90% of them, two days after birth. The high level of delayed EIBF is strongly influenced by knowledge and culture. The results of subsequent statistics indicated that EIBF can reduce neonatal mortality by 22%. In developing countries, EIBF can reduce as much as 1.45 million deaths each year.

In normal childbirth care, EIBF is also an important step that must be carried out by health workers in assisting the delivery process, as well as the enactment of Government Regulation (GR) No.33/2012 concerning the exclusive feeding of breastmilk. The government’s efforts to succeed in the EIBF program not only in GR but also with the ‘Jampersal’ (birth guarantee) which began in 2011 with the aim to improve the quality of delivery services assisted by health workers who have understood the principles of EIBF implementation.

Various factors that cause low EIBF practices in Indonesia included lack of education, attitudes and motivation of breastfeeding mothers, and are influenced by the behavior and actions of midwives who do not conduct counseling on EIBF during pregnancy and do not support the management of EIBF in normal childbirth care and family support⁷. According to the 2010 IDHS data, the determinant of EIBF implementation consists of 1) infant factors; sex and birth weight, 2) maternal factors; health status, age, parity, education, knowledge and employment, 3) health service factors; antenatal care and birth attendant. Of the 3 factors that influence the implementation of EIBF in the 2010 IDHS data, there
is no data on the role of the family (husband / parents and relatives) in this case. Supported by research done by Sirajuddin\textsuperscript{6}, mentioned that success in implementing EIBF was not only from health workers but also from husband and family support. Family support is a very important factor in the practice of EIBF apart from internal factors; knowledge, attitudes, experiences and perceptions of mothers and external factors; health facilities and childbirth attendants\textsuperscript{7}. The purpose of this study was to determine and analyze the success factors of EIBF in the New Jumpandang Health Center.

**Methodology**

**Research Design**

This type of research is an analytic observational survey using a cross sectional study design approach to determine the success factors analysis of Early Breastfeeding Initiation (EIBF) at the New Jumpandang Health Center in Makassar, South Sulawesi.

**Population, Samples and Sample Techniques**

The population in this study was mothers giving birth with normal deliveries in the area of New Jumpandang Health Center in Makassar, South Sulawesi. The total sample in this study was 80 new mothers that had normal delivery. The sampling technique was purposive sampling.

**Data Collection and Analysis**

Data collection was carried out by direct observation using questionnaire instruments. The obtained data was processed using SPSS version 21 software and two statistical analyses (univariate and bivariate) were done.

**Results and Discussion**

**Univariate Analysis**

From Table 1 it is known that the distribution of successful EIBF from 80 samples was 44 deliveries with a percentage of 55% and those who did not succeed in EIBF were 36 deliveries with a percentage of 45%. Distribution based on baby weight born from 80 samples, babies born with 2500 - 3000 g are 54 babies with a percentage of 67.5%, 21 (26.3%) babies within 3100 - 3500 g, and 5 babies (6.3%) were 3600 - 4000 g.

**Table 1. Distribution of EIBF and weight of newborn baby (g)**

<table>
<thead>
<tr>
<th>EIBF</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful</td>
<td>44</td>
<td>55.0</td>
</tr>
<tr>
<td>Fail</td>
<td>36</td>
<td>45.0</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>New born baby weight (g)</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500 – 3000</td>
<td>54</td>
<td>67.5</td>
</tr>
<tr>
<td>3100 – 3500</td>
<td>21</td>
<td>26.3</td>
</tr>
<tr>
<td>3600 – 4000</td>
<td>5</td>
<td>6.3</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 2 it can be seen that the age distribution of mothers giving birth to the age group too young, which is <20 years is 57 people with a percentage of 71.3%, normal age is 21 - 35 years as many as 14 people with a percentage of 17.5% and age group too old that is > 35 years as many as 9 people with a percentage of 11.3%. Based on the characteristics of maternal education out of the 80 samples, 24 people studied up to higher education and those with low education were 56 mothers. Characteristics of maternal parity with no risk are parity 1-3 known to be 60 people with a percentage of 75.5% and those that are with high parity risk( > 3) are 20 people with a percentage of 25%. The characteristics of maternal knowledge with a good category are 49 people with a percentage of 61.3% and a category of poor knowledge were 31 people with a percentage of 38.8%. Characteristics of antenatal care (ANC) frequency among mothers during pregnancy under the high category were 55 people with a percentage of 68.8% and 25(31.3%) had low ANC frequency.
Table 2. Distribution based on maternal characteristics

<table>
<thead>
<tr>
<th>Characteristics of mother</th>
<th>Category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>&lt; 20</td>
<td>57</td>
<td>71.3</td>
</tr>
<tr>
<td></td>
<td>21 – 35</td>
<td>14</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>&gt; 35</td>
<td>9</td>
<td>11.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
<td>Higher education</td>
<td>24</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Lower education</td>
<td>56</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Parity</td>
<td>1 – 3</td>
<td>60</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>&gt; 3</td>
<td>20</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>Knowledge</td>
<td>Good</td>
<td>49</td>
<td>61.3</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>31</td>
<td>38.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>ANC frequency</td>
<td>High</td>
<td>55</td>
<td>68.8</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>25</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

Bivariate Analysis

Based on Table 3, it can be seen that the proportion of infants in category A (2500 - 3000 g) who managed to get EIBF was 32 (59.26%) and those who did not succeed in EIBF were 22 (47.74%), in category B (3100 – 3500g) who succeeded in EIBF was 9 (42.86%) and did not succeed in EIBF were 12 (57.14%), and category C (3600 - 4000 g) had 3(60%) success EIBF and 2(40%) failed EIBF. The results of statistical analysis showed that there was no significant relationship between birth weight and the success of EIBF with a value of p = 0.43 means > 0.05, which can be concluded that there is no significant relationship between BBL and the success of EIBF in the Jumpandang Baru Makassar health center.

Table 3. Relationship between weight of newborn and the effectiveness of EIBF

<table>
<thead>
<tr>
<th>Weight of newborn</th>
<th>EIBF</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Success</td>
<td>Fail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Category A</td>
<td>32</td>
<td>59.26</td>
<td>22</td>
</tr>
<tr>
<td>Category B</td>
<td>9</td>
<td>42.86</td>
<td>12</td>
</tr>
<tr>
<td>Category C</td>
<td>3</td>
<td>60.00</td>
<td>2</td>
</tr>
</tbody>
</table>

Data presented in Table 4 shown that the proportion of mothers aged <21 years who managed to do EIBF were 5 (55.55%) and those who did not succeed in EIBF were 4 (44.44%), 32 (56.14%) mothers aged 21 - 35 managed to EIBF while mothers aged more than 35, only 25 of them had a successful EIBF. However, the results of statistical analysis showed that there was no significant relationship between maternal age and EIBF success with p = 0.92. The proportion of tertiary education who managed to do EIBF were 29 (51.78%) and did not succeed in EIBF were 27 (48.21%), and 15 low education mothers succeeded in EIBF while the remaining 9 had a failed EIBF. The statistical analysis indicated that there was no significant relationship
between maternal education and the success of EIBF since the value of p = 0.38. The proportion of parity 1-3 who succeeded in EIBF were 30 (50%) and did not succeed in EIBF 30 (50%), and parity> 3 who succeeded in EIBF were 14 (70%) and 6(30%) did not succeed in EIBF. The results of statistical analysis showed that there was no significant relationship between parity and the success of EIBF with a value of p = 0.11. Prawirohardjo stated that based on the amount of parity, mothers with parity> 3 times tend not to succeed in EIBF because they usually face difficulties in pregnancy and labor, especially excessive fatigue, which affects emotional stability to carry out EIBF. Conversely, mothers with parity 1-3, usually have a greater motivation to do and know what is beneficial for their babies. In addition, the ideal birth span from the psychological aspect provides an opportunity for parents to devote more time to their children at the beginning of their age.

Table 4. Relationship between maternal age, education and parity with the effectiveness of EIBF

<table>
<thead>
<tr>
<th></th>
<th>EIBF</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Success</td>
<td>Fail</td>
<td>n</td>
</tr>
<tr>
<td>Maternal age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>21 - 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>25</td>
<td>57</td>
</tr>
<tr>
<td>&gt; 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>27</td>
<td>56</td>
</tr>
<tr>
<td>Lower education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>9</td>
<td>24</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>&gt;3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

With reference to Table 5, it is found that the proportion of knowledge of both mothers who managed to EIBF was 28 (57.14%) and did not succeed in EIBF by 21 (42.87%), and poor knowledge that managed to EIBF were 16 (51.61%) and did not succeed in EIBF were 15 (48.38%). The results of statistical analysis showed that there was no significant relationship between maternal knowledge with the success of EIBF with a p value = 0.63. This is not in accordance with the theory of Helsing et al" and Amalia, who stated that the frequency of breastfeeding is higher among educated women. Learned mothers are more aware of the physiological and psychological benefits of breastfeeding early. In addition, educated mothers are more motivated and have more opportunities to get information since they have facilities. Nelvi also agreed that there is a meaningful relationship between educations with early breastfeeding where high-educated respondents carry out a successful EIBF of 74.7% unlike less-educated mothers. Based on this concept, implicitly explains that the failure of EIBF in mothers with low education will be more than those who successfully carry out EIBF. The mother category with good knowledge in accordance with the research conducted by Sutriyani, that is knowledgeable mothers have a great opportunity to want to do a job, so there is a relationship between mother’s knowledge with the success of EIBF, but in the category of lack knowledge, the number of respondents who managed to do more EIBF than those who did not. But increasing knowledge does not always reflect behavior change. Some of the factors that influence a person’s behavior are knowledge and attitudes, but the formation of behavior itself is not solely based on it but is still influenced by many very complex factors.

The proportion of good ANC frequencies that managed to EIBF was 28 (50.90%) and did not succeed
in EIBF by 27 (49.09%), and mothers with poor knowledge that managed to EIBF were 16 (64%) and did not succeed in EIBF were 9 (36%). Statistical analysis implied that there was no significant relationship between the frequency of ANC with the success of EIBF with a value of $p = 0.27$. The proportion of mothers that had midwives with good knowledge that managed to EIBF were 40 (61.53%) and did not succeed in EIBF were 25 (38.46%), and those mothers that had midwives with poor knowledge whom managed to EIBF were 4 (26.67%) and did not succeed in EIBF were 11 (73.33%). The results of statistical analysis showed that there was a significant relationship between the knowledge of midwives with the success of EIBF with a value of $p = 0.01$ means <0.05, thus it is concluded that there is a significant relationship between the knowledge of the medical officers/midwives and the success of EIBF.

The proportions of mothers whom had midwives with good behavior, managed to EIBF were 34 (72.34%) and did not succeed in EIBF were 13 (27.66%). Only 10 (30.30%) of the mothers whom had the midwives with poor behavior managed to EIBF while the remaining 23 (69.69%) failed in EIBF. The results of statistical analysis showed that there was a significant relationship between the attitudes of midwives with the success of EIBF with a $P$ value = 0.00 which is > 0.05, thus it can be concluded that there is a significant relationship between the attitudes of midwives and the success of EIBF in the Jumpandang Baru Makassar health center.

### Table 5. Relationship between mother’s knowledge, frequency of ANC, knowledge of midwives and behavior of midwives with the effectiveness of EIBF

<table>
<thead>
<tr>
<th>EIBF</th>
<th>Success</th>
<th>Fail</th>
<th>Total</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Mother’s knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>28</td>
<td>57.14</td>
<td>21</td>
<td>42.87</td>
</tr>
<tr>
<td>Poor</td>
<td>16</td>
<td>51.61</td>
<td>15</td>
<td>48.38</td>
</tr>
<tr>
<td>Frequency of ANC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>28</td>
<td>50.90</td>
<td>27</td>
<td>49.09</td>
</tr>
<tr>
<td>Low</td>
<td>16</td>
<td>64.00</td>
<td>9</td>
<td>36.00</td>
</tr>
<tr>
<td>Midwives’ knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>40</td>
<td>61.53</td>
<td>25</td>
<td>38.46</td>
</tr>
<tr>
<td>Poor</td>
<td>4</td>
<td>26.67</td>
<td>11</td>
<td>73.33</td>
</tr>
<tr>
<td>Midwives’ behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>34</td>
<td>72.34</td>
<td>13</td>
<td>27.66</td>
</tr>
<tr>
<td>Poor</td>
<td>10</td>
<td>30.30</td>
<td>23</td>
<td>69.69</td>
</tr>
</tbody>
</table>

### Conclusion and Recommendations

Based on the results and discussion, it was concluded that there was no significant relationship between the weight of the baby born with the success of EIBF in the Jumpandang Baru Health Center ($p = 0.43$), the birth weight did not affect the success of EIBF. ($p = 0.92$), maternal age is not a barrier to the success of EIBF. ($p = 0.38$), meaning that maternal parity is not a barrier to the success of EIBF. ($p = 0.11$), maternal education is not an obstacle to the success of EIBF. ($p = 0.63$), maternal knowledge is not a factor that inhibits the success of EIBF. ($p = 0.27$), the frequency of ANC also does not become a major factor inhibiting the success of EIBF.
There is a significant relationship between the knowledge of midwives and the success of EIBF (P 0.01), meaning that knowledge of midwives is a factor that supports the success of EIBF. The better the knowledge of birth attendants (midwives) about EIBF, the better the success of EIBF and there is a significant relationship between the attitude of midwives and the success of EIBF (p value= 0.00), implying that the more active the midwife is, the higher the success rate of EIBF.

Acknowledgement: The authors would like to thank Faculty of Medicine, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


5. Determinants of early breastfeeding initiation (IMD) DI ... [Internet]. [cited2014Dec09]. Availablefrom: http://pasca.unhas.ac.id/jurnal/files/


Relationship between Childbirth Duration and Postpartum Blues

Amalia Rizki Meilina¹, Nasrudin A. M¹, Budu¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245.
Sulawesi Selatan, Indonesia

Abstract

The study aimed to determine relationship between childbirth duration and postpartum blues. The study was using cohort research design to determine relationship between childbirth duration and postpartum blues. The study was conducted in maternity ward of Pangkep district Hospital for two months duration. The study population were all mothers who came to give birth at Pangkep district Hospital during intervention period. The sample sizes were 60 respondents which met the criteria for this study. The data was analysed using SPSS program. The result found 80% of respondents experienced postpartum blues. Most respondents (83.3%) aged between 20 years and 35 years (low risk), while highest parity percentage was in multiparous mothers (70%). There were 63.3% of respondents had low education level and 78.3% had pregnancy planning. The statistical test had obtained of phase I (p=1.000), phase II (p=1.000) and phase III (p= 0.340).

Keywords: Education level; Parity; Postpartum period; Pregnancy planning.

Introduction

Approximately 85% of women experienced mood disturbance during their postpartum period¹. Postpartum period is critical period which biological, social, physical and emotional changes². There are three diverse but continuous phases; third phases known as delayed postpartum period which end up to 6 months³. The postpartum period lead women highly susceptible to many psychiatric disorders. The psychiatric disorder during postpartum period included postpartum blues (maternity or baby blues), postpartum depression and puerperal psychosis³.

The postpartum blues were conditions classified by anxiety, irritability, lack of concentration, frequent crying and mood swing⁴,⁵. This postpartum blues is commonly occurred in western countries due to lack of family bonding and support⁶. The symptom was usually happened on day 3 or day 4, which continues for hours up to several days⁷. The real cause of postpartum blues is still unknown. However, many factors are contributed to postpartum blues included hormonal factors associated with changes in estrogen, progesterone, prolactin and estradiol levels. The low estrogen level after childbirth is very influential in postpartum emotional disorder since estrogen had affected monoamine oxidase enzyme activity. Besides, demographic factors also contributed in postpartum emotional disorder such as age and parity, pregnancy and childbirth experience, mother’s psychosocial background, fearful of losing or disappointment toward their infant. The postpartum blues could develop into postpartum depression or severe symptom of postpartum psychosis. The study aims to determine relationship between childbirth duration and postpartum blues.

Methodology

Study design

The study was using cohort research design to determine relationship between childbirth duration and postpartum blues.

Study location and time

The study was conducted in maternity ward of Pangkep district Hospital for two months duration.

Study population and sample

The study population were all mothers who given birth delivery at Pangkep district Hospital...
during intervention period. The sample sizes were 60 respondents which met the criteria for this study.

**Data collection**

The primary data was obtained from the partograph and questionnaire, while secondary data was obtained from patient’s medical records. The data collection process was assisted by midwives who worked in maternity ward to observe childbirth duration by using partograph.

**Data analysis**

The data was analysed using SPSS program. Univariate analysis was represented in form of frequency distribution table. Meanwhile, bivariate analysis was performed to determine relationship between dependent variable and independent variable by using chi square test.

**Results and Discussion**

**Univariate Analysis**

Based on Table 1, most of respondents, 50 respondents (83.3%) were low risk categories aged between 20 years and 35 years. Meanwhile, 42 respondents (70%) were multi parous and only 18 respondents (30%) were primipara. This study also found 38 respondents (63.3%) had low education level (primary school and junior high school) and 22 respondents (36.7%) had high education level (high secondary school, academy and university). There were 47 respondents (78.3%) had pregnancy planning and 13 respondents (21.7%) had no pregnancy planning.

<table>
<thead>
<tr>
<th>Respondent Characteristic</th>
<th>Frequency (n= 60)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk</td>
<td>50</td>
<td>83.3</td>
</tr>
<tr>
<td>(20 years to 35 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High risk</td>
<td>10</td>
<td>16.7</td>
</tr>
<tr>
<td>(&lt;20 years or &gt; 35 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiparous</td>
<td>42</td>
<td>70</td>
</tr>
<tr>
<td>Primipara</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>22</td>
<td>36.7</td>
</tr>
<tr>
<td>Low</td>
<td>38</td>
<td>63.3</td>
</tr>
<tr>
<td>Pregnancy planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>47</td>
<td>78.3</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>21.7</td>
</tr>
</tbody>
</table>

There were 48 respondents (80%) had experienced postpartum blues and 12 respondents (20%) had no experience in postpartum blues occurrence. In childbirth duration phase I, 32 respondents (53.3%) had normal duration and 28 respondents (46.7%) had long childbirth duration. Meanwhile, 47 respondents (78.3%) had normal duration and 13 respondents (21.7%) had long childbirth duration on phase II. There were 37 respondents (61.7%) had normal childbirth duration and 23 respondents (38.3%) had long childbirth duration on phase III.
Table 2: Frequency distribution of respondents based on postpartum blues occurrence criteria

<table>
<thead>
<tr>
<th>Postpartum blues occurrence</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>48</td>
<td>80</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3. Frequency distribution of respondents based on childbirth duration of phase I, phase II and phase III

<table>
<thead>
<tr>
<th>Childbirth</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>32</td>
<td>53.3</td>
</tr>
<tr>
<td>Long</td>
<td>28</td>
<td>46.7</td>
</tr>
<tr>
<td>Phase II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>47</td>
<td>78.3</td>
</tr>
<tr>
<td>Long</td>
<td>13</td>
<td>21.7</td>
</tr>
<tr>
<td>Phase III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>37</td>
<td>61.7</td>
</tr>
<tr>
<td>Long</td>
<td>23</td>
<td>38.3</td>
</tr>
</tbody>
</table>

Bivariate Analysis

There were 39 respondents (78%) who aged in low risk and 9 respondents (90%) were high risk who experienced postpartum blues. Meanwhile, 11 respondents (22%) who were in low risk and only one respondent (10%) were in high risk with no experience in postpartum blues. The statistical test found no relationship between age and postpartum blues occurrence. In additions, 42 respondents had multiparous and 18 respondents had primipara. There were 34 respondents (81%) had multiparous with postpartum blues occurrence and only 4 respondents (22.2%) had primipara without postpartum blues occurrence. The chi square test showed no significant relationship between parity and postpartum blues. In education level category, 33 respondents (86.8%) had low education level who experienced postpartum blues and 7 respondents (31.8%) had high education level with no experience in postpartum blues occurrence. There was no significant relationship between education level and postpartum blues occurrence. Furthermore, 10 respondents (21.3%) had pregnancy planning with no experience in postpartum blues and 11 respondents (84.6%) had no pregnancy planning with experienced postpartum blues occurrence.

Table 4. Frequency distribution of respondents based on age, parity, education level and pregnancy planning with postpartum blues occurrence

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>No</th>
<th>%</th>
<th>Yes</th>
<th>%</th>
<th>Total</th>
<th>%</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk</td>
<td>11</td>
<td>22</td>
<td>39</td>
<td>78</td>
<td>50</td>
<td>100</td>
<td>0.670</td>
</tr>
<tr>
<td>High risk</td>
<td>1</td>
<td>10</td>
<td>9</td>
<td>90</td>
<td>10</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiparous</td>
<td>8</td>
<td>19</td>
<td>34</td>
<td>81</td>
<td>42</td>
<td>100</td>
<td>0.740</td>
</tr>
<tr>
<td>Primipara</td>
<td>4</td>
<td>22.2</td>
<td>14</td>
<td>77.8</td>
<td>18</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>31.8</td>
<td>15</td>
<td>68.2</td>
<td>22</td>
<td>100</td>
<td>0.102</td>
</tr>
<tr>
<td>Low</td>
<td>5</td>
<td>13.2</td>
<td>33</td>
<td>86.8</td>
<td>38</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Pregnancy planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>21.3</td>
<td>37</td>
<td>78.7</td>
<td>47</td>
<td>100</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>15.4</td>
<td>11</td>
<td>84.6</td>
<td>13</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Besides, 26 respondents (81.3%) had normal childbirth duration in phase I and experienced postpartum blues occurrence and 6 respondents (21.4%) had long childbirth duration and had no experience in postpartum blues occurrence. The statistical test showed no significant relationship between childbirth duration and postpartum blues occurrence. Meanwhile, 10 respondents (21.3%) had normal childbirth duration without postpartum blues occurrence and 11 respondents (84.6%) had long childbirth duration with experience postpartum blues occurrence in phase II. In additions, 28 respondents (75.7%) had normal childbirth duration with postpartum blues occurrence and 3 respondents (13%) had long childbirth duration with no experience in postpartum blues occurrence for phase III.

Table 5. Relationship between childbirth duration (phase I, II and III) with postpartum blues occurrence

<table>
<thead>
<tr>
<th>Childbirth duration</th>
<th>Postpartum blues occurrence</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>Yes</td>
</tr>
<tr>
<td>Phase I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>6</td>
<td>18.8</td>
<td>26</td>
</tr>
<tr>
<td>Long</td>
<td>6</td>
<td>21.4</td>
<td>22</td>
</tr>
<tr>
<td>Phase II</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>10</td>
<td>21.3</td>
<td>37</td>
</tr>
<tr>
<td>Long</td>
<td>2</td>
<td>15.4</td>
<td>11</td>
</tr>
<tr>
<td>Phase III</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>9</td>
<td>24.3</td>
<td>28</td>
</tr>
<tr>
<td>Long</td>
<td>3</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Phase I</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>6</td>
<td>18.8</td>
<td>26</td>
</tr>
<tr>
<td>Long</td>
<td>6</td>
<td>21.4</td>
<td>22</td>
</tr>
</tbody>
</table>

**Overall Discussion**

The study found high postpartum blues incidence because most respondents were experienced in postpartum blues, 80%. In additions, a study found high postpartum blues prevalence in Semarang city, 67.5% and low postpartum blues incidence had recorded in Taiwan only 40%. Most of postpartum blues occurred in high risk age (<20 years and > 35 years). The statistical test showed no significant relationship between age and postpartum blues occurrence. This study also supported by several studies which found no correlation between age and postpartum blues. Based on the parity, postpartum blues in multiparous mother was 81% and 77.8% occurred in primipara mother. The postpartum blues incidence occurred in mothers of any ethnicity, race and parity. Furthermore, there is no significant relationship between parity and postpartum blues. The mother with primipara had high risk suffering postpartum blues than mother with multiparous. Besides, mother with primipara had experienced many difficulties in parents’ role adaption.

Based on education level, 86.8% of respondents with low education level had experienced postpartum blues. The mother with low education level had large number of children and lack in infant’s care quality since pregnancy had occurred during their young age.
There was no significant relationship between education level and pregnancy planning with postpartum blues. A study found higher postpartum blues risk in unmarried or without family planning than mother with good in family planning. The pregnancy planning is correlated to mother’s readiness in physical, mental and economy.11.

Furthermore, the statistical test also found no significant relationship between childbirth duration and postpartum blues occurrence. The result was indicated respondents had normal childbirth duration experienced postpartum blues than respondents with prolonged labour. Hence, childbirth duration is not caused postpartum blues among respondents. The family support also had influenced postpartum blues occurrence among women. The postpartum blues is high risk occurred in mother with lack of family supports. The women easily to be influenced with certain emotional disturbance during their pregnancy, labour and postpartum. A strong and consistent family support is main key factor in postpartum blues prevention.

**Conclusion**

In conclusions, there was no significant relationship between respondent characteristic (age, parity, education level and pregnancy planning) and childbirth duration with postpartum blues occurrence. The fixed screening procedure should be done on postpartum mothers to detect postpartum blues with using Edinburg Postnatal Depression Scale (EPDS) or other recommended instruments.

**Acknowledgement:** The author would like to thank to Pangkep district Hospital for information support and Faculty of Medicine, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Correlation between Internal and External Factors toward Exclusive Breastfeeding on Working Mothers

Andi Indah Mardhatillah¹, Nurhikmawaty Hasbiah¹, Andi Besse Ahsaniyah¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245.
Sulawesi Selatan, Indonesia

Abstract

The breast milk is first and best food for the infant since contains various nutrients needed by the infant. However, the working mother become an obstacle giving exclusive breast feeding. This study aimed to determine the internal and external factors that affected exclusive breastfeeding on working mothers. The study was used descriptive correlational with cross sectional study design. The sample sizes were 37 respondents which selected by purposive sampling that met inclusion criteria such as mother who had infant aged more than 6 months until 24 months, working in the formal sector, breastfeeding the infant, the infant was first child and single birth and willing to be a respondent. The data was analysed by using bivariate analysis with chi square test. The result showed internal factors such as maternal knowledge about lactation management had r=0.350 and p=0.033 and maternal psychological condition had p-value of 0.014 and r=0.414 with exclusive breastfeeding on the working mothers. The external factors such as breastfeeding facilities condition had p-value of 0.006 and r=0.454 while time availability factor for the infant had p-value=0.286 and r=0.175 and leadership policy had p=0.666 and r=0.071.

Keywords: Leadership policy; Maternal knowledge about lactation management; Maternal psychological condition; Time availability; Working mothers.

Introduction

Maternal breastfeeding is natural and suitable ways to feed a child in the first months of life to promote sufficient growth and development¹. World health Organization (WHO) began suggested the infants be exclusive breastfeeding in 1990 and stated optimal duration is six months². Exclusive breastfeeding means infants only receive only breast milk³. Meanwhile, breastfeeding is encouraged after 6 months together with introduction of other foods and liquids⁴.

Breast milk is ideal nutrition which providing all of the nutrient including vitamins and minerals that an infant need for first six months of life⁵. The breast milk contains all essential nutrient including carbohydrates, essentials, proteins, minerals and immunological factors⁶. The exclusive breastfeeding has potential to decrease under five death by 11.6% with exclusive breastfeeding prevalence is still relatively low in worldwide and 90% of exclusive breastfeeding practices has decrease the infant death incidence due to pneumonia⁷. Meanwhile, non-exclusive breastfeeding in first six months of life leads in 1.4 million mortality and 10% of diseases in under-fives and contributes to long term impact such as poor school performance, decreases productivity and impaired intellectual and social development⁸.

There was several factors correlated with not initiating exclusive breastfeeding or with discontinue exclusive breastfeeding before 6 months such as lower maternal age, low socioeconomic status and educational level, unsupportive work environment, insufficient care during birth and in the postnatal period, low birth weight, inadequate milk supply, previous negative experiences with breastfeeding or attitudes regarding exclusive breastfeeding before birth among others⁹. Besides, another study found younger women with lower incomes, ethnic minorities and full-time employees were stop breastfeeding within first month of infant’s life, while other studies found breastfeeding duration is longer in better educated mothers¹⁰.

The study has classified that exclusive breastfeeding by working mothers was influenced by two factors such as internal factors including mother knowledge
about lactation management, maternal psychological condition, while external factor such as time availability for infant, breastfeeding conditions and leadership policy. The support for exclusive breastfeeding programs for working mothers is breakthrough that can increase the coverage of national exclusive breastfeeding.

Physiotherapy treatment has wide range of women health role including able to provide education as promotive and preventive step and special interventions related to lactation management to breastfeeding mothers. This lactation management can help to prevent the occurrence of main exclusive breastfeeding failure among working mothers. This study aims to determine the internal and external factors that affect exclusive breastfeeding on working mothers.

Methodology

Study design

The study was used descriptive correlational research with cross sectional design.

Study location and time

The study was conducted in Berua district of Makassar on 12th April until 10th May 2017.

Study population and sample

The study population was all mothers working in the formal sector, domiciled in Berua district and had infant aged more than 6 months until 24 months. The study samples were 37 mothers who met the inclusion criteria such as mother who had infant aged more than 6 months until 24 months, working in the formal sector, breastfeeding the infant, the infant was first child and single birth and willing to be a respondent.

Data analysis

The data was analysed using SPSS program and bivariate analysis was done to determine the relationship between dependent and independent variable using chi square test.

Results and Discussion

Univariate Analysis

In Table 1, there were 21 respondents (56.8%) aged between 26 years old and 30 years old and 9 respondents (24.3%) aged between 31 years old and 35 years old. There were 20 respondents (54.1%) who were completed degree and 10 respondents (27.0%) were completed master. Meanwhile, 20 respondents (54.1%) were working less than 8 hours per day and 17 respondents (45.9%) had working hours between 9 hours and 11 hours. In additions, 14 respondents (37.9%) had salary less than Rp. 5,000,000, while 15 respondents (40.5%) had earned salary between Rp. 5,000,001 and Rp. 10,000,000. Besides, only 8 respondents (21.6%) had earned more Rp. 10,000,001.

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age (years old)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-25</td>
<td>7</td>
<td>18.9</td>
</tr>
<tr>
<td>26-30</td>
<td>21</td>
<td>56.8</td>
</tr>
<tr>
<td>31-35</td>
<td>9</td>
<td>24.3</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>7</td>
<td>18.9</td>
</tr>
<tr>
<td>Degree</td>
<td>20</td>
<td>54.1</td>
</tr>
<tr>
<td>Master</td>
<td>10</td>
<td>27</td>
</tr>
<tr>
<td>Total working hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 8 hours per day</td>
<td>20</td>
<td>54.1</td>
</tr>
<tr>
<td>9-11 hours per day</td>
<td>17</td>
<td>45.9</td>
</tr>
<tr>
<td>≥ 12 hours per day</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Monthly salary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ Rp. 5,000,000</td>
<td>14</td>
<td>37.9</td>
</tr>
<tr>
<td>Rp. 5,000,001 – Rp. 10,000,000</td>
<td>15</td>
<td>40.5</td>
</tr>
<tr>
<td>≥ Rp. 10,000,001</td>
<td>8</td>
<td>21.6</td>
</tr>
</tbody>
</table>
**Bivariate Analysis**

Furthermore, 17 respondents (45.9%) had good knowledge in lactation management, while 3 respondents (8.1%) had medium knowledge in lactation management for exclusive breastfeeding mothers. Meanwhile, 9 respondents (24.3%) had good knowledge and 8 respondents (21.6%) had medium knowledge about lactation management for nonexclusive breastfeeding mothers.

In additions, 17 respondents (45.9%) had good psychological condition and 3 respondents (8.1%) had poor psychological condition for exclusive breastfeeding mothers. Meanwhile, 8 respondents (21.6%) had good psychological condition and only 9 respondents (24.3%) had poor psychological condition.

There was correlation between internal factors and exclusive breastfeeding included maternal knowledge about lactation management ($p=0.033<0.05$) with correlation value ($r=0.350$) by 12% which the relationship between two variables is strong enough. Meanwhile, there also correlation between psychological condition and exclusive breastfeeding with $p=0.014<0.05$ with percentage of correlation coefficient value ($r=0.414$) by 17% proved the relationship between two variables is strong enough.

**Table 2. Relationship between internal factors with exclusive breastfeeding on working mother**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exclusive breastfeeding</th>
<th>p-value</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exclusive</td>
<td>Non-exclusive</td>
<td></td>
</tr>
<tr>
<td>Maternal knowledge about lactation management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>17</td>
<td>45.9</td>
<td>9</td>
</tr>
<tr>
<td>Medium</td>
<td>3</td>
<td>8.1</td>
<td>8</td>
</tr>
<tr>
<td>Poor</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maternal psychological condition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>17</td>
<td>45.9</td>
<td>8</td>
</tr>
<tr>
<td>Poor</td>
<td>3</td>
<td>8.1</td>
<td>9</td>
</tr>
</tbody>
</table>

Meanwhile, 14 respondents (37.9%) had time availability and 6 respondents (16.2%) had no time availability for their babies in exclusive breastfeeding mothers. There were 9 respondents (24.3%) had time availability and 8 respondents (21.6%) had no time availability with their babies for non-exclusive breastfeeding mothers. There were 16 respondents (43.2%) had sufficient breastfeeding condition and 4 respondents (10.8%) had insufficient breastfeeding conditions for exclusive breastfeeding mothers. In additions, 6 respondents (16.2%) had sufficient breastfeeding condition, while 11 respondents had insufficient breastfeeding conditions for non-exclusive breastfeeding mothers. Furthermore, 12 respondents (32.4%) were supported in leadership policy and 6 respondents (21.6%) were not supported in leadership policy for exclusive breastfeeding mothers. There were 9 respondents (24.3%) had supported in leadership policy and 8 respondents (21.6%) were not supported in leadership policy.

The external factors associated with exclusive breastfeeding in mothers were breastfeeding conditions ($p=0.006<0.05$) with percentage of correlation coefficient ($r=0.454$) of 21% indicated the relationship between two variables was strong enough. Another two other external factors did not show any relationship with exclusive breastfeeding such as time availability for the babies ($p=0.286$) with percentage of correlation coefficient ($r=0.175$) at 3% showed the relationship between two variables was weak and the leadership factor ($p=0.666$) with the percentage of correlation coefficient value ($r=0.071$) which greater than 0.05 indicated the relationship between two variables was very weak.
Table 3. Relationship between time availability for the infant with exclusive breastfeeding toward working mother

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exclusive breastfeeding</th>
<th>p-value</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exclusive</td>
<td>Non exclusive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Time availability for infant</td>
<td>Yes</td>
<td>14</td>
<td>37.9</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>6</td>
<td>16.2</td>
</tr>
<tr>
<td>Breastfeeding conditions</td>
<td>Sufficient</td>
<td>16</td>
<td>43.2</td>
</tr>
<tr>
<td></td>
<td>Insufficient</td>
<td>4</td>
<td>10.8</td>
</tr>
<tr>
<td>Leadership policy</td>
<td>Support</td>
<td>12</td>
<td>32.4</td>
</tr>
<tr>
<td></td>
<td>Not support</td>
<td>6</td>
<td>21.6</td>
</tr>
</tbody>
</table>

Overall Discussion

The high women participation and participated in all working areas as one reason that most mothers to provide the formula milk. Hence, working mothers often go for work or involved in social tasks that formula milk ins considered only way out in the food provision for the infants.

In this study, exclusive breastfeeding mothers proportion was reached 54% which relevant that majority of respondents were well-informed, good psychological conditions and sufficient breastfeeding means. The maternal knowledge of lactation management is associated with exclusive breastfeeding in working mothers where the relationship between these two variables is strong enough. Suryani (2016) found the relationship between knowledge and exclusive breastfeeding mothers (p=0.041) which higher maternal knowledge with higher exclusive breastfeeding behaviour.

The breastfeeding knowledge is important role in maintaining human life. The mother will losing confidence to provide best care for the infant, infant would losing vital food resource and optimal care means. This study showed there was relationship between the maternal psychological condition and exclusive breastfeeding in the working mothers which two variables are strong enough. The result indicated better maternal psychological condition and better breastfeeding behaviour.

Utari et al. revealed maternal psychological condition did not showed correlation with exclusive breastfeeding. The time availability for infant is not correlated to exclusive breastfeeding in the working mother which the relationship between two variables is quite weak. In this study, most respondents (54.1%) had working hour less than 8 hours per day. Meanwhile, some respondents claimed short distance from house and workplace, so the respondents managed go back home every few hours to feed their infants and often brought their infants to their workplace.

This study showed there was relationship between breastfeeding condition and exclusive breastfeeding in the mothers which the relationship between two variables was strong enough. The high sufficient breastfeeding means in the workplace, more likely the mother is to give exclusive breastfeeding. In this study, insufficient lactation support was found in some respondents since less breastfeeding room in the workplace. There is also have no refrigerator available for storing the breast milk as well as lack of rest period for breastfeeding. In additions, some respondents brought their infants to workplace claimed need to build own space for their infants to play and rest in form of box at the room corner.
The statistical test also showed no significant relationship between leadership policy and exclusive breastfeeding in the working mothers which relationship between two variables were very weak. Most corporate leaders were not concerned with working women who wanted to breastfeed their infants at the workplace leads some working mothers felt ashamed and hiding in certain area for breastfeeding or simply pumping breast milk.

Acknowledgement: The author would like to thank to all respondents in Berua district of Makassarand Faculty of Medicine, Hasanuddin University for unconditional support.

Conclusion

In conclusion, there was correlation between internal factor, maternal knowledge about lactation management and psychological condition with exclusive breastfeeding in the working mothers. In external factors, there was relationship between breastfeeding conditions and exclusive breastfeeding in the working mothers. Meanwhile, other factors such as time availability for the infant and the leadership policy did not have any relationship with exclusive mother breastfeeding. The maternal knowledge of lactation management was most dominant factor in giving exclusive breastfeeding to working mothers. This study is expected to be reference source for future study and should identify more diverse factors related to exclusive breastfeeding in working mothers as well as controlling confounding variables that may affects the study result.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Influence of Oxytocin Massage on Oxytocin Concentration Level and Involution on Postpartum Mothers in Siti Khadijah I Maternity Hospital, Makassar City

Asyima¹, Nasrudin A. M¹, Irfan Idris¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245.
Sulawesi Selatan, Indonesia

Abstract

The study aimed to determine influence of oxytocin massage on oxytocin concentration levels and uterine involution on postpartum mothers in Siti Khadijah I Maternity Hospital, Makassar city. The study was used quasi experimental research design with two groups post-test included intervention and control groups. The study population were all postpartum mothers at Siti Khadijah I Maternity Hospital, Makassar city. The samples sizes were 40 respondents which divided into two group included 20 respondents in intervention group and 20 respondents in control group that met the study criteria. The samples were obtained by using purposive sampling method. The data was analysed using SPSS program. The univariate analysis is represented as frequency distribution for each variable. The bivariate analysis is used to determine influence of oxytocin massage on oxytocin concentration changes and uterine involution among postpartum mothers. The statistical test in oxytocin concentration and oxytocin massage level among postpartum mothers had obtained p=0.005. Meanwhile, Mann Whitney test in oxytocin massage and oxytocin hormone concentration among postpartum mothers with p=0.005.

Keywords: Fundal height; Maternal parity; Oxytocin hormone; Postpartum period; Uterine involution.

Introduction

The postpartum period known as “fourth stage of labour and had three distinct but continuous phase: initial or acute period which included first 6-12 hours postpartum, subacute postpartum period which lasts 2-6 weeks and delayed postpartum period which last up to 6 months”. Meanwhile, Ozturk et al. mentioned postpartum period is transition period for women to adapt difficulty after birth, new order in the family and differences in the body image. The postpartum period was time that changes in external and internal occurred especially psychic transformations which women required protection and care. Besides, this period was period which uterine involution and restored ovarian function for new pregnancy.

The uterine involution is referred to the return of uterus size to non-pregnant size as normal as oestrous cycle. The uterus involution had been determined by fundal height and its difficult in uterine myoma and obese women. The oxytocin hormone is important to increase uterine contraction after labour which avoid postpartum haemorrhage occurrence and maternal oxytocin levels also was related to uterine atony occurrence. The oxytocin hormone had released into bloodstream through posterior pituitary during labour, after sexual stimulation, stress, lactation and social interaction and uterine dilation. The oxytocin hormone levels was observed higher in pregnant women than non-pregnant women. The oxytocin massage is spinal massage from fifth or sixth costa until scapula which stimulated parasympathetic nerves so that prolactin and oxytocin hormone are released. The aim of study to determine influence of oxytocin massage on oxytocin concentration levels and uterine involution on postpartum mothers in Siti Khadijah I Maternity Hospital, Makassar city.

Methodology

Study design

The study was used quasi experimental research design with two groups post-test included intervention
and control groups to determine influence of oxytocin massage for oxytocin concentration enhancement and uterine involution.

**Study location and time**

The study was conducted from February to March 2016 at Siti Khadijah I Maternity Hospital, Makassar city.

**Study population and sample**

The study population were all postpartum mothers at Siti Khadijah I Maternity Hospital, Makassar city. The samples sizes were 40 respondents (20 respondents in intervention group and 20 respondents in control group) which met the study criteria: i) third day postpartum mothers who had normal labour, ii) no any systemic disease and good mental health. The samples were obtained by using purposive sampling method.

**Data analysis**

The data was analysed using SPSS program.

**Results and Discussion**

**Univariate Analysis**

Based on Table 1, 27 respondents (67.5%) were aged between 26 years and 30 years old and only 3 respondents (7.5%) were aged between 31 years and 35 years. There were 23 respondents (57.5%) had low education level and 17 respondents (42.5%) had high level education level. Most respondents were housewives represented 60% of respondents, while 10 respondents were worked as civil servants and 6 respondents (15%) were private employee. Meanwhile, 21 respondents (52.5%) were multigravida mothers and only 1 respondent (2.5%) were grand multiparous mothers.

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-25</td>
<td>10</td>
<td>25.0</td>
</tr>
<tr>
<td>26-30</td>
<td>27</td>
<td>67.5</td>
</tr>
<tr>
<td>31-35</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>23</td>
<td>57.5</td>
</tr>
<tr>
<td>High</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>24</td>
<td>60.0</td>
</tr>
<tr>
<td>Civil servant</td>
<td>10</td>
<td>25.0</td>
</tr>
<tr>
<td>Private employee</td>
<td>6</td>
<td>15.0</td>
</tr>
<tr>
<td>Maternal parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primigravida</td>
<td>18</td>
<td>45.0</td>
</tr>
<tr>
<td>Multigravida</td>
<td>21</td>
<td>52.5</td>
</tr>
<tr>
<td>Grand multiparous</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>Fundal Height</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 finger widths below navel</td>
<td>10</td>
<td>25.0</td>
</tr>
<tr>
<td>3 finger-width below navel</td>
<td>30</td>
<td>75.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>
Bivariate Analysis

The mean of oxytocin hormone concentration among postpartum mothers with oxytocin massage were 490.6556 and postpartum mothers without oxytocin massage had mean of oxytocin hormone concentration of 370.9201. The Mann Whitney test found significant relationship between oxytocin massage and oxytocin hormone concentration.

Table 2. Analysis on mean differences of oxytocin concentration among postpartum mothers who had received oxytocin massage and without oxytocin massage

<table>
<thead>
<tr>
<th>Oxytocin massage</th>
<th>Oxytocin hormone concentration</th>
<th>Mann Whitney test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Yes</td>
<td>490.6556</td>
<td>148.52392</td>
</tr>
<tr>
<td>No</td>
<td>370.9201</td>
<td>93.29645</td>
</tr>
</tbody>
</table>

Based on Table 3, mean of uterine involution among postpartum mothers with oxytocin massage and without oxytocin massage were 1.5000. There was significant relationship between oxytocin massage and uterine involution among postpartum mothers in Siti Khadijah I Maternity Hospital, Makassar city.

Table 3. Analysis on mean differences of uterine involution among postpartum mothers who had received oxytocin massage and without oxytocin massage

<table>
<thead>
<tr>
<th>Oxytocin massage</th>
<th>Uterine involution</th>
<th>Mann Whitney test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>Yes</td>
<td>1.5000</td>
<td>0.50637</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multivariate Analysis

The data was using Mean CAT analysis to obtain oxytocin hormone category. The postpartum mothers who performed oxytocin massage with oxytocin hormone category 2, while postpartum mothers without oxytocin massage was in category 1. In additions, uterine involution among postpartum mothers with oxytocin massage was in category 1 and uterine involution among postpartum mothers without oxytocin massage in category 3.7.

Overall Discussion

The results showed most respondents were aged between 26 years and 30 years and these respondents were primigravida and multipara mothers which had knowledge and experience in pregnancy and childbirth. Besides, most respondents were housewives, low education and multiparous mothers. The parity also influenced in uterine involution process. The uterine involution process tends to decline in multiparous mothers than primigravida mothers due to lack of elasticity of uterus muscles. The results also found there were significant influence of oxytocin massage toward oxytocin hormone concentration and uterine involution among postpartum mothers. The oxytocin massage helped to stimulate uterine contractions during labour and after labour to accelerate the uterine involution.
The mean differences of oxytocin hormone levels between postpartum mothers with oxytocin massage and postpartum mothers without oxytocin massage. The postpartum mothers who did not received oxytocin massage had 5 times greater risk in having abnormal uterine involution than postpartum mother had oxytocin massage. The oxytocin hormone levels also had influenced by other factors such as early breastfeeding initiation which help in improve uterine contraction. Dyna et al. found oxytocin massage increased prolactin hormones levels and production of breast milk among respondents with post caesarean section mothers. Meanwhile, Sari et al. mentioned combination of endorphin massage and oxytocin massage accelerated uterine involution in normal postpartum mothers. The oxytocin levels are higher in women with normal childbirth than women with caesarean delivery.

Besides, oxytocin levels are slowly increased until birth delivery and slow down up to 8 weeks postpartum period. Lothian et al. suggested oxytocin ease placenta separation and maintain uterus contraction to prevent excessive bleeding. In additions, Kosova et al. also mentioned oxytocin help uterus to return to its pre-pregnancy dimension by uterus contraction. The oxytocin massage had increased oxytocin hormone levels which improve uterus contraction and prevent the bleeding occurrence.

Acknowledgement: The author would like to thank to Siti Khadijah I Maternity Hospital, Makassar city for information support and Faculty of Medicine, Hasanuddin University for unconditionally support.

Conclusion

In conclusions, there was influence on oxytocin concentration levels and uterine involution among postpartum mothers who had received oxytocin massage. The nurses and midwives should improve their knowledge in oxytocin massage technique, while the hospital need to apply oxytocin theory during massage on postpartum mothers to accelerate the uterine involvement occurrence.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

3. doi: 10.20319/lijhls.2017.32.6576


Utilization of Home Care Services among the Fishermen Community at Makassar City

Citra Ayu Lestari Hanisu¹, Suriah¹, H. Watief A. Rachman¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

A care which allows a person with special needs to continue staying in their house is called home care. It is beneficial for people who are chronically ill, disabled or getting older. The aim of this study to determine the utilization of home care services in fishermen community at Makassar city. The study type was qualitative research with phenomenology design. The study informants were determined by using purposive sampling method. The informants included 4 patients, 12 patient’s family members, 3 home care staffs, and head of basic service and referral section of Makassar city Health Office. The data was obtained through in-depth interview and observation and then analyzed using content analysis and represented in the narration. The results found that fishermen community who utilized home care services has lack of knowledge but with positive attitude towards home care services. The home care staffs were friendly, kind and alert in serving the patients included fishermen communities. In additions, home care services are more effective and efficient in term of time, accessibility to health center and economy.

Keywords: fishermen; home care; health care; service

Introduction

The ageing population is growing rapidly worldwide. The world population over 60 years would be double from 12% to 22% between 2015 and 2050¹. The older adults aged 65 years and above are expected to represent at least of 28% of population in Switzerland². According to World Health Organization (WHO), the number of people utilizing health services in India was 60.4 million people, 98.5 million in China and 38.4 million people in other part of Asia countries³. In United States, older adults aged 65 years and above had utilized 36% of health care which only representing 13% of population⁴.

Based on National Health Survey (SUSENAS) showed 32.4% of population with poor status had utilized health services and integrated health post were most visited for health services with 61.6%⁵. The health services utilization is influenced by several factors such as socio demographic conditions, attitudes, beliefs and social culture, socio economics, distance to health facilities, health service cost and service time⁶.

Several studies were conducted to determine factors impacting health services among community. A study found several factors included individual characteristics (age, education and illness perception), availability of health workers, distance to health centres and availability of transportation are associated toward utilization of health centres by the community⁷. In Manado city, a study found significant correlation between perception, accessibility to health services and health workers behaviour toward health service utilization by social insurance administration organization participant⁸.

Makassar city has 46 public health centres (Puskesmas) in 2015. Makassar city Health Office had implemented several programs such as Telemedicine and E-Puskesmas to encourage community in health service utilization. Home care was aimed for people who had limitation on accessing health centres due to several factors such as long distance to health centre, limitation of accessibility of transportation and socio-economic
status. In 2016, there were 2170 people had utilized home care services where 2058 people had been treated and 112 people are referred. The fisherman community conditions in term of economy and demography is very influential on health services utilization in Makassar city. The geographical location of fishermen community on the island leads to limitation of accessibility on health facilities. Home care services is one of health services which helps in health status improvement in the fishermen community of Makassar city, especially Ujung Tanah sub district. Hence, the aim of this study is to determine the utilization of home care services among fishermen community in Makassar city.

Methodology

Study Type

This study type was qualitative method by using phenomenology design.

Location and Time

This study was conducted from March 2016 to April 2016 at Ujung Tanah sub district in Makassar city.

Study Informant

The informants were determined by using purposive sampling technique. The informants were selected according to study criteria i) fishermen community living in Ujung Tanah sub district; ii) utilizing home care services; iii) patient or patient’s family. In additions, home care staffs and head of basic service and referral section of Makassar city Health Office also were selected as informants in this study.

Data Collection and Data Analysis

The data was obtained through in-depth interview and observation. Subsequently, the data was analysed using content analysis and represented in the narration.

Result and Discussion

Result

The result found some informants were not aware about home care services despite receiving home care services. The nurses mentioned socialization had been done to the community and home care services call centres also have been affixed in some locations. Besides, some informants called home care services as home visit services after further explanation. The head of basic services and referral section of Makassar city Health Office revealed home care services are home visit done by contacting nearby health call centre. Home care services had divided into 3 types; visiting patients, patient follow up patient and emergency. Based on this study, most informants had received home care services information from their surrounding such as neighbours, communities and own initiatives. The accessibility on home care services varied ranging from informants visit to Puskesmas, request or advice from Puskesmas staff and head of village. The informant had informed Puskesmas staffs that patients have home care services but facing difficulty go to health centres. Informant’s knowledge level on home care service is summarized in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding toward home care services</td>
<td>Some informants are not aware on home care services despite receiving home care services. According to home care staffs, home care is defined as home visit services by contacting health call centre.</td>
</tr>
<tr>
<td>Information resource</td>
<td>Most of informants received information about home care services from their neighbour and their own initiative. Meanwhile, home care staffs mentioned most of communities had utilized home care services before socialization.</td>
</tr>
<tr>
<td>Accessibility on home care</td>
<td>The accessibility of home care services varied ranging from visiting Puskesmas itself, advice from Puskesmas staff and head of village.</td>
</tr>
</tbody>
</table>

Most of informants gave a positive feedback on home care services as shown in Table 2. The informants claimed home care services made their life more convenient and very helpful in accessing health services by calling health centre via phone. Most of informants found home care staffs were friendly and kind. Besides, there were no complaints from patients regarding the services provided by home care staffs. In contrast, some informants still dissatisfied with service provided even staffs had friendly and kind attitude.
Table 2. Informant’s feedback towards home care services in fishermen community at Makassar city

<table>
<thead>
<tr>
<th>Variable</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>Good feedback from informants toward home care service</td>
</tr>
</tbody>
</table>

Based on study, some informants found fast response from home care staffs to serve the patients after contacting the health centres. Nonetheless, there are informants who also claimed delay in services from staffs itself due to several factors such as hot weather, lot of patients in health centres and limited transportation. Informants’ feedbacks about home care staff’s behaviour towards home care services can be found in Table 3. The informants claimed home care services are more effective and efficient in term of time, transportation and economy as tabulated in Table 4. The geographical conditions, transportation and illness lead patients to prefer home care services. Based on in-depth interviews, most informants felt home care services fulfilled their needs for physical health by receiving free treatment. The drugs and services from home care staffs are without any charges. However, some informants claimed that home care services did not fulfil their health needs since treatment did not concentrate on chronic illness.

Table 3. Home care staff’s behaviour toward home care services in fishermen community at Makassar city

<table>
<thead>
<tr>
<th>Variable</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friendly</td>
<td>Home care staffs were very friendly and kind. Even though, some informants dissatisfied with services provided by staffs there were no complaint from patients itself regarding the services.</td>
</tr>
<tr>
<td>Response</td>
<td>Home care staffs are alerted to serve patients. Yet, some informants claimed there were delays in services due to several factors.</td>
</tr>
</tbody>
</table>

Table 4. Informant’s need towards home care services in fishermen community in Makassar city

<table>
<thead>
<tr>
<th>Variables</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reason for utilizing home care</td>
<td>Some informants found home care services are more effective and efficient in terms of time, transportation and economy.</td>
</tr>
<tr>
<td>Benefit and need from home care services</td>
<td>Home care services fulfilled informant’s need for their physical health.</td>
</tr>
</tbody>
</table>

Overall Discussion

The result found that the community still have lack of understanding or knowledge concerning home care services. The informants never know about home care either from mass communication or Puskesmas. The fishermen community regarded home care services as home visits after further explanation on home care definition is given. Besides, none of the informants utilized home care services by contacting health call centre. Some informants still use home care services but had no knowledge on home care services. Hence, knowledge had no influenced in home care services utilization. A study found correlation between confidence and interest at inpatient services of Stella Maris Hospital due to health workers ability in treatment.

Based on in-depth interviews, all informants have a positive attitude towards home care services. Home care services increased informant’s opportunity in obtaining health services from health centres. The perceptions and attitude had correlated with health services utilization in Bhayangkara Hospital at Makassar city. However, there is also a study that found no relationship between attitude and health services in Dr Haulussi Ambon Hospital at Maluku province.

Most informants were satisfied with services provided by home care staffs. The home care staffs are friendly and kind towards informants. Besides, there exist a good communication between home care staffs and patients. The staffs always contact the patients to enquire updates on their health conditions. Furthermore, these staffs are always alerted on informants request for the services. Limitation of transportation, high number of patients in Puskesmas and hot weather has led to staffs arriving late to patient’s house. The good communication, friendliness and kindness have made
patients felt comfortable and willing to receive home visit from health centres.

Most informants who utilized home care services due to lack of physical conditions. Besides, informants considered home care services more effective and efficient in term of time, transportation and economy. Moreover, most patients who utilized home care services suffered chronic diseases such as stroke, diabetes mellitus and pulmonary tuberculosis.

Conclusion

In conclusions, the fishermen community who utilized home care services have lack of knowledge but with positive attitude toward home care services. The home care staffs were friendly, kind and alert in serving the patients including the fishermen communities. In additional, home care services are more effective and efficient in terms of time, accessibility to health centre and economy.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


8. Rumengan DS, Umboh JM, Kandou GD. Factors related to the utilization of health services in health BPJS participants at Paniki Bawah Health Center, Mapanget District, Manado City. JIKMU. Mar 3 2015;5(2).


The Relationship between Asymptomatic Urinary Tract Infections in Pregnant Women with Preterm Labor in RSKD IA Siti Fatimah Makassar

Dahniar¹, St.Nurasni², Irfan Idris³
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

Urinary Tract Infection (UTI) is the growth of microorganisms in the urinary tract that is not normally contains bacteria, viruses or other microorganisms. Urinary tract infection is an infection that often occurs in pregnancy which is around 4-10%. This study aimed to assess the association between asymptomatic urinary tract infections in pregnant women with preterm labor. This research method is quantitative research with cross sectional. Sampling using purposive sampling as many as 28 respondents to preterm labor with gestational age <37 weeks in the delivery room RSKD IA Siti Fatimah Makassar. The results of the study indicated that there were 28 babies born prematurely in RSKD IA Siti Fatimah Makassar. 8 (26.6%) premature infants were born with asymptomatic urinary tract infection and 20 (71.4%) of premature infants did not experience urinary tract infection. The weight of mothers who experience asymptomatic urinary tract infection had significant relationship (p = 0.03) compared to the weight of women who did not have urinary tract infection, while the average weight of infants was lower among mothers with asymptomatic urinary tract infection in comparison to the baby weight of mothers who did not experience UTI has no significant difference (p = 0.195). In conclusion there are 8 (28.6%) of preterm birth with asymptomatic urinary tract infection in RSKD IA Siti Fatimah Makassar in 2016 and is generally caused by the bacterium Klebsiella pneumoniae.

Keywords: bacterium Klebsiella pneumoniae; infant; premature delivery; urinary tract infections

Introduction

Urinary Tract Infection (UTI) is the development of microorganisms in the urinary tract which normally do not contain bacteria, viruses or other microorganisms. The human urinary tract is the organs that work to collect and store urine and release urine from the body. Asymptomatic bacteriuria is most commonly found in cases of UTI which is around 2-10%

WHO defined premature labor as labor that occurs before the 37th week of gestation. While in Indonesia, 24% of cases of UTI were found in women. This figure is worrying considering that 30% of premature parturition was caused by UTI in 2013. Based on the data from the South Sulawesi Provincial Health Office, the incidence of preterm birth caused by UTI in 2007 was 530 cases (0.29%) from 137,984 deliveries, in 2008, 490 cases (0.34%) of 145,769 births assisted by health workers, and in 2009 there were 20 cases (0.1%) of 145,769 deliveries.

Premature labor is dangerous because it has a potential impact on increasing perinatal mortality. The lower the gestation period and the smaller the baby is born, the higher the risk of morbidity and mortality. According to the data, preterm labor reaches 75-80% of all causes of babies who die in neonatal (age less than 28 days).

Loynd et al. reported there were 2-7% cases of pregnant women developed urinary tract infections and as many as 40% of them developed asymptomatic bacteriuria.

Untreated asymptomatic bacteriuria causes premature birth and low baby weight (LBW) around 1.5
to 2 times. A study conducted in Cairo by Elsokkary\(^5\), concluded that the prevalence of pregnant women with asymptomatic bacteriuria who delivered premature birth was quite high (23.5%). These findings reinforced the results of research conducted in the country by Haider\(^6\) which found 35% of women with UTI gave birth to premature baby. He conducted a study with 232 pregnant women in Hyderabad Pakistan and concluded that the increasing frequency of UTIs in pregnant women is related to the factors of multiparity, the presence of UTI history, low socioeconomic status, frequent sexual activity, and low education\(^7\).

According to Krisnadi et al\(^8\), in Sarwono if this asymptomatic bacteriuria is not treated, about 25% of the patients will then experience acute symptomatic infection during the pregnancy. In some studies, bacteriuria has been reported to cause a number of adverse effects in pregnancy. Asymptomatic bacteriuria in pregnancy is often forgotten as one of the causes of pregnancy complications in the mother and fetus such as preterm labor.

From some literature and hypotheses it has been suggested that one of the predispose factors is due to infection, including urinary tract infections. Although still controversial, bacteriuria conversion has been linked to several studies. Schieve et al\(^9\). did a multivariate analysis of perinatal outcomes with a cohort design in 25,476 maternal and child pairs, reporting that there was an increased risk of LBW, preterm birth, hypertension or preeclampsia, and anemia in the mother. Asymptomatic urinary tract infections in pregnancy with the incidence rate were 4-10%, whereas in Indonesia ranges between 20-25% and about 10-20% can cause premature labor\(^3\). The type of bacteria that causes asymptomatic urinary tract infections in pregnant women with preterm labor is Klebsiella pneumonia. The aim of this study was to investigate the significance difference between asymptomatic UTI and the baby’s weight and the significance of the relationship between asymptomatic UTI and the mother’s weight.

**Methodology**

**Research Location and Design**

This research was carried out on May 23-June 18 of 2016 at IA Siti Fatimah Hospital, South Sulawesi. This study used a cross-sectional quantitative approach, which looked at the relationship between asymptomatic UTI in pregnant women with preterm labor in IA Siti Fatimah Makassar Hospital.

**Population and Sample**

The population in this study was all pregnant women who had preterm labor in IA Siti Fatimah Makassar Hospital, as many as 30 people. The sample size used the Isaac and Michael formula, which are 28 people with purposive sampling technique that meets the inclusion and exclusion criteria.

**Data collection and analysis**

Data on the implementation of direct observation with observation and history sheets, consisting of respondents’ identities, and objective data of pregnant women who experienced preterm labor with asymptomatic urinary tract infections. Urine collection while examining urine culture (mid-stream) was done in University Hasanuddin RSP laboratory. The distributed data was tested using the t-independent statistical test for significant level (\(\alpha = 0.05\)).

**Results**

**Univariate analysis**

Based on Table 1, the highest numbers of respondents are those with no risk age and no UTI, as many as 17 respondents (85%) and asymptomatic UTI respondents are not at risk as many as 7 respondents (8.75%). While the lowest respondents were at risk with no UTI as many as 3 respondents (15%) and asymptomatic UTI respondents were at risk as many as 1 respondent (12.5%). In terms of education, 13 respondents (65%) with low education level had no UTI whereas 6 respondents (75%) had asymptomatic UTI. Among those mothers with high education, 7 respondents (35%) had not UTI while as many as 2 respondents (25%) had asymptomatic UTI. From the highest respondent parity, there were 12 (60%) multigravida respondents with no UTI but 3 (37.5%) multigravida respondents with asymptomatic UTI. The lowest parity in primigravida with no UTI was 8 respondents (40%) whereas primigravida with asymptomatic UTI as many as 5 respondents (62.5%). With reference to the low socio-economic respondents, 12 respondents (60%) do not have UTI but then 1 respondent (12.5%) had asymptomatic UTI. In the category of moderate socioeconomic, 5 respondents (25%) had not UTI but as many as 6 respondents (75%) had asymptomatic UTI. On the other hand, the number
of respondents in high socioeconomic category with no UTI and asymptomatic UTI were 3 respondents (15%) and 1 respondent (12.5%) respectively.

**Table 1. Respondents’ characteristics**

<table>
<thead>
<tr>
<th>Respondents’ characteristics</th>
<th>No UTI</th>
<th></th>
<th>Asymptomatic UTI</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Risk (&lt;20 and &gt;35 years old)</td>
<td>3</td>
<td>15</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>No risk (20-35 years old)</td>
<td>17</td>
<td>85</td>
<td>7</td>
<td>8.75</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>35</td>
<td>2</td>
<td>25</td>
</tr>
<tr>
<td>Low</td>
<td>13</td>
<td>65</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primigravida (1x partus)</td>
<td>8</td>
<td>40</td>
<td>5</td>
<td>62.5</td>
</tr>
<tr>
<td>Multigravida (&gt; 1x partus)</td>
<td>12</td>
<td>60</td>
<td>3</td>
<td>37.5</td>
</tr>
<tr>
<td>Socio-Economic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>15</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>Moderate</td>
<td>5</td>
<td>25</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>Low</td>
<td>12</td>
<td>60</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>

The data from Table 2 indicated that the bacteriuria is found mostly in the 20 respondents (71.4%) who were not infected with UTI, and only a small amount was detected in the 8 respondents (28.6%) who experienced asymptomatic UTI.

In the same Table 2, it is also shown that preterm labor that was experienced among the majority of respondents (19 people) was late preterm. 28.6% of the mothers had very preterm while the remaining 3.6% had extremely preterm labor.

Based on Table 3, the types of bacteria that cause asymptomatic urinary tract infection were Klebsiella pneumoniae bacteria which infected 4 people (50%), while each of these bacteria (*bacterium E, Pseudomonas aerogenosa bacteria, Alkaligenes faecalis bacteria and Acinotobacter baumanni*) infected 4 person in total but only with 1 cases of infection for each bacteria.

**Table 2. Respondents’ characteristics with type of UTI and type of premature labor**

<table>
<thead>
<tr>
<th>Respondents’ characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriuria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptomatic UTI</td>
<td>8</td>
<td>28.6</td>
</tr>
<tr>
<td>No UTI</td>
<td>20</td>
<td>71.4</td>
</tr>
<tr>
<td>Premature Labor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Late preterm</td>
<td>19</td>
<td>67.9</td>
</tr>
<tr>
<td>Very preterm</td>
<td>8</td>
<td>28.6</td>
</tr>
<tr>
<td>Extremely preterm</td>
<td>1</td>
<td>3.6</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table 3. Types of bacteria causing Asymptomatic UTI during premature labor**

<table>
<thead>
<tr>
<th>Type of bacteria</th>
<th>Asymptomatic UTI</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>Klebsiella pneumonia</td>
<td>4</td>
</tr>
<tr>
<td>E.coli</td>
<td>1</td>
</tr>
<tr>
<td>Pseudomonas aerogenosa</td>
<td>1</td>
</tr>
<tr>
<td>Acinotobacter baumanni</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
</tr>
</tbody>
</table>
Bivariate analysis

From Table 4, the respondents with preterm labor who were late preterm experienced asymptomatic UTI as many as 15.8% and no UTI as many as 84.2%. 62.5% respondents with very preterm experienced asymptomatic UTI while the balance 37.5% had no UTI. Those mothers that had extremely preterm, none of them had asymptomatic UTI but 1 person had no UTI. Thus, for asymptomatic urinary tract infections in pregnant women with preterm labor, there were significant differences.

Table 4. Types of premature labor and bacteriuria

<table>
<thead>
<tr>
<th>Types of premature labor</th>
<th>No UTI</th>
<th></th>
<th>Asymptomatic UTI</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Late preterm</td>
<td>16</td>
<td>84.2</td>
<td>3</td>
<td>15.8</td>
</tr>
<tr>
<td>Very preterm</td>
<td>3</td>
<td>37.5</td>
<td>5</td>
<td>62.5</td>
</tr>
<tr>
<td>Extremely preterm</td>
<td>1</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Table 5. Differences in baby’s weight and mother’s weight according to asymptomatic urinary tract infection and not urinary tract infection

<table>
<thead>
<tr>
<th>Bacteriuria</th>
<th>N</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight of baby (g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptomatic UTI</td>
<td>8</td>
<td>2023.7</td>
<td>478.84</td>
<td>0.195</td>
</tr>
<tr>
<td>No UTI</td>
<td>20</td>
<td>2246.6</td>
<td>367.96</td>
<td></td>
</tr>
<tr>
<td>Weight of mother (g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptomatic UTI</td>
<td>8</td>
<td>54.3</td>
<td>4.06</td>
<td>0.03</td>
</tr>
<tr>
<td>No UTI</td>
<td>20</td>
<td>57.6</td>
<td>1.22</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

This study shows that 8 people (28.6) with asymptomatic UTI and as many as 20 people (71.4%) without UTI. This is because most of the non-UTIs cases do not occur in preterm labor unlike those with Asymptomatic UTI.

Asymptomatic bacteriuria is the presence of 100,000 bacteria or more per milliliter of urine from patients without complaints of urinary tract infections. This bacteriuria may not be accompanied by symptoms, called asymptomatic bacteriuria and may be accompanied by symptoms called symptomatic bacteriuria. Based on Table 5, the weight of infants with asymptomatic UTI had a mean weight of 2023.7 g and standard deviation of 478.84 whereas weight of infants without UTI had a mean weight of 2246.6 g and standard deviation of 367.96. The p value which equaled to 0.195 showed the presence of significant difference between UTI and baby’s weight. While the weight of mothers with asymptomatic UTI averaged 54.3 kg and standard deviation 4.06. Average weight and standard deviation of mother’s weight without UTI were 57.6 kg and 1.22 respectively. Value of P = 0.03 showed a significant relationship between UTI and maternal weight.

Premature labor can be triggered by several conditions such as infection, ischemia in the fetus and accompanied by the uterus, because on the surface of the placenta and amniotic membrane contains a lot of macrophages. Based on the theory that preterm labor is dangerous because of the potential of increased in perinatal mortality by 65% -75%. Low birth weight can be caused by premature birth and inhibited fetal growth. Both should be prevented because of the negative impact of not only perinatal death but also morbidity, potential for future generations, mental birth and economic burden for the family.

Late preterm (32-36 mg) about 98% of babies born at this age can survive. Most of them weigh 3 to 5 pounds,
but still look thinner than babies who are old enough, whom can breathe themselves, but many of them also need oxygen support to breathe. These babies are less at risk of developmental delays than babies born earlier. However, they still have a high risk of experiencing learning and behavioral development problems. It is estimated that at 35 weeks of pregnancy, the weight of baby’s brains is only about two-thirds of babies who are old enough.

Very preterm (28 - <32 mg) in this group, babies looks similar to babies born with ages less than 28 mg, although their body weight is greater (usually between 2 to 4 pounds), and is more likely to live longer (around 96% ). Some of them could also cry and they could move more, although their movements were like jerks. They can hold their fingers, open their eyes, and start to be awake for a short period. Nevertheless, babies born in the womb age from 28 to <32 weeks, remain at risk of experiencing medical complications.

Extremely preterm (<28 mg) there is only less than 1% of babies born at the age of less than 28 mg. Most of these babies are born with a really low body weight (< 2 pounds, 3 ounces). Almost all of them would require treatment with oxygen, surfactants, and mechanical assistance to facilitate breathing. Babies of this category are very immature to be able to suck, swallow and breathe at the same time, so they must be fed through an intravenous therapy (IV) so they can develop their abilities. Their skin is wrinkled and reddish purple and very thin to the extent the blood vessels under their skin are visible.

Research done by Gustina, stated that parity with the incidence of premature parturition had a significant relationship (p = 0.000), whereby patients who had given birth more than 3 times had a 4 times greater risk of having preterm labor compared to patients whose parity was less than 3. Some literature says preterm labor is more common in multiparous patients, caused by the presence of uterine scarring due to pregnancy and previous labor. Thus, the increased levels of arachidonic acid trigger the release of inflammatory mediators such as histamine, cytokines, leukotrienes and prostaglandins. The inflammatory mediators released cause an inflammatory reaction with intermediaries of white blood cells including macrophages, neutrophils, and lymphocytes to carry out phagocytic processes in bacteria. Active molecules such as prostaglandin E2 (PGE2) and prostaglandin F2 (PGF2) are involved in the normal birth process. Certain cytokines such as interleukin-1 (IL-1), interleukin 6 (IL-6), tumor necrosis factor alpha (TNF-α) stimulate PGE2 synthesis from the placenta and chorioamnion. In normal pregnancy, the intraamnion mediator increases physiologically until the threshold is reached at the point of birth, causing cervical dilation and labor.

In this study, Klebsiella pneumonia in preterm labor had infected 8 people and is present in the airways and feces around 5% of normal people and can cause bacterial pneumonia. The main disease caused by this bacterium is pneumonia. Klebsiella pneumonia can cause disease because it has two types of antigens on the cell surface including O antigen is lipopolysaccharide which is found in 9 varieties and K antigen is a polysaccharide surrounded by capsules with more than 80 varieties. These two antigens increase the pathogenicity of Klebsiella Pneumonia.

This is in line with the research of Dewi, entitled sepsis test in children with germ pattern and sensitivity. The study aimed to obtain the type of bacteria that causes sepsis and antibiotic susceptibility testing, so that it can be used as a guideline for treatment of sepsis. A total of 21 samples obtained cultures with positive results with the most bacteria were Klebsiella pneumoniae (24%), Serratia marcescens (14%), and Burkholderia cepacia (14%). The most common cause of sepsis in children is Klebsiella pneumoniae, Serratia marcescens, and Burkholderia cepacia with antibiotics that are still sensitive are cefepime and levofloxacin.

Conclusion

There is a relationship between asymptomatic urinary tract infections in pregnant women with preterm labor. In addition, there were significant differences between the baby’s weight and asymptomatic urinary tract infection. Weight of the mother with asymptomatic urinary tract infection with no urinary tract infection too, seemed to have a significant relationship. The type of bacteria that caused asymptomatic urinary tract infections in pregnant women with preterm labor is Klebsiella pneumonia bacteria with 30% of the babies having UTI.

Acknowledgement: The authors would like to thank Faculty of Medicine, Hasanuddin University for their support and facilities in conducting this study. The
authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


13. GUSTINA F. Haenszel Coat-Squared Test Application and Double Logistic Regression Test For Assessment of Confounding Roles on the Relationship between Doctoral Dissertation, AIRLANGGA UNIVERSITY.


15. Jannah M. Relationship of urinary tract infections in pregnant women to premature labor in Dr. RSUD the adjudication spreads Banten in the January to December period.2010.


The Behaviour of Consuming Alcohol of Adolescents in South Bolaang Mongondow Regency of North Sulawesi Province

Dalviyani¹, Ridwan M. Thaha¹, Sukri Palutturi¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study is to determine the behaviour of consuming alcohol among adolescents in South Bolaang Mongondow Regency. The study was conducted using qualitative method with phenomenological design. There were 52 participants involved in this study included 20 adolescents were alcohol consumers, 14 adolescent’s parents consumed alcohol, 6 health officers, 4 community leaders, 3 police officers and 5 alcohol sellers. The results of study indicated average adolescents consuming alcohol ranged from 6 to 15 years old since influenced by their friend when met up at night. The adolescents consumed alcohol during hang out with friends, looked cool, forgot their problems, and increased their self-esteem. The type of alcoholic drinks consumed were “cap tikus”, “cap tikus” mixed with Pepsi, coke, “komix” mixed with M150. Besides, adolescents had stew cowhide fungus and inhaled glue brand “Fox”. The adolescents only know alcoholic beverages are intoxicating beverages. The parents who consumed alcohol greatly affected their children to consume alcohol, too. The role of health officers, community leaders, and even police officers are important since their efforts haven’t reduced number of adolescents who consume alcohol.

Keywords: Adolescents; Behaviour of consuming alcohol

Introduction

The adolescent is transition period from childhood into adulthood period which aged 10-19 years¹. This period is critical period since biological, cognitive, social and emotional that affected their life. The adolescent is defined in ranged of age of 10-18 years and ended between age 19 and 24²-⁴. The adolescence among rapid development phased in human life⁵. In this period, adolescence had involved in academic and professional decision, identity develops, orientation toward future and expectation from family and teacher⁶.

Social issues are major problem among adolescence⁷. The social issue lead problem in adolescence is alcohol consumption. In 2010, worldwide per capital alcohol consumption was 6.2 liters of pure alcohol consumed by every person aged 15 years or older⁸. Based on National Institute on Alcohol Abuse and Alcoholism (NSDUH)⁹, estimated 623, 000 adolescence aged 12-17 years had alcohol use disorder in United States (National Institute on Alcohol Abuse and Alcoholism, Alcohol facts and statistics). The alcohol is caused many health problems such as liver cirrhosis, mental illness, cancer, pancreatitis and fetus damage among pregnant women¹⁰,¹¹. The alcohol consumption in adolescence was interfered with adolescent brain development and increased development risk of alcohol use disorder. Besides, alcohol consumption in adolescence is contributed in consequences action such as injuries, sexual assaults and death.

Several factors had influenced alcohol consumption in adolescent such as inadequate childhood attachment, insecure, parental figures, poor self-esteem, environment triggered, easy accessibility, peer influence, anxiety, and family problem¹². The adolescent also claimed rewarding value was part of alcohol consumption such as cope or escape unpleasant emotions, to be sociable, and enjoy mood enhancement³. In a study, peer and parental factors in shaped friendship tie choice and alcohol consumption
behaviour. Meanwhile, a study suggested adolescent with parent had alcohol problem also likely to drink more alcoholic beverages compared adolescent that parent without alcoholic problem.

In Indonesia, 18.1% of total population aged 10-19 years in 2012. The prevalence of alcohol consumption in last one month was 4.9% in male and 0.3% in female. The beverage types consumed by men in urban areas were 33.6% beer, 14.4 % liquor, 27.1% wine and 25.0 % traditional alcohol. Meanwhile, men in rural area had consumed 18.6% beer, 6.6% liquor, 19.4% wine and 55.4% traditional alcohol.

In North Sulawesi province, alcohol consumption rate is increased lead to health problem and crimes cases. From initial observations, 10 adolescents consumed alcohol because peer and environment influenced. The alcohol types consumed in adolescents was traditional hard (cap tikus) with M150 and beer. The study was conducted to find out behaviour of consuming alcohol among adolescents in South BolaangMangondow Regency.

**Methodology**

The study was conducted using qualitative method with phenomenological design. There were 52 participants involved in this study included 20 adolescents were alcohol consumers, 14 adolescent’s parents that consumed alcohol, 6 health officers, 4 community leaders, 3 police officers and 5 alcohol sellers. The data were obtained through in-depth interview, non-participant observation, and Focus Group Discussion (FGD). In this study, observation was conducted on adolescents toward their behaviour, knowledge and attitude toward alcohol consumption. Besides, role of family, community leaders, authorities (police) and alcohol distributor also observed in this study.

The questions that prepared for interview are:

1. Understanding toward alcohol
2. Type of alcohol and type most consumed by adolescents
3. Age for adolescents to start consuming alcohol
4. Background of adolescents consumed alcohol for first time
5. Place used to consume alcohol
6. How to get alcohol?
7. The adolescent’s behaviour toward alcohol consumption
8. Impact of alcohol consumption behaviour on the adolescents
9. Behaviour of adolescents after alcohol consumption
10. Role of families toward alcohol consumption behaviour in adolescents
11. Understanding toward the alcohol
12. Understanding toward the alcohol
13. The experience in alcohol consumption for parents
14. Prohibition of parent toward alcohol consumption
15. Knowledge toward law or value about alcohol consumption
16. Understanding toward alcohol
17. Response and opinion about alcohol consumption behaviour in adolescent
18. Response and opinion about alcohol consumption behaviour in adolescents
19. The supported factors and inhibitors to overcome alcohol behaviour in adolescents
20. The knowledge of health officer about alcohol and alcohol type consumed by adolescents
21. The response and opinion from health officers about alcohol consumption behaviour in adolescents
22. The efforts were done by health officer to prevent alcohol consumption behaviour in adolescents
23. The program introduced by health officers to reduce alcohol consumption behaviour in adolescents
24. The reason of alcoholic seller to sell alcohol
25. Understanding about alcohol and prohibition toward selling alcohol
26. The response and opinion toward alcohol consumption behaviour in adolescents
27. The response and opinion toward alcohol consumption behaviour in adolescents
28. The efforts had been made in control alcohol consumption behaviour in adolescents

**Result and Discussion**

The understanding toward alcohol consumption was one of predisposed factor encouraged alcohol consumption behaviour in adolescents. Based on
interview result, teenagers only understood that alcohol is intoxicating drink. The adolescents had same understanding level about meaning of alcohol, average of teenagers understood alcohol had consumed is intoxicating and reduce consciousness. Most of adolescents said their own family and friend’s invitation and lead them to consume alcohol. The FGD results showed main reasons for alcohol consumption were friend’s invitation, relieved stress and looked cool in their friend group.

Most common type of alcohol consumed by adolescents was “cap tikus” alcohol as same as FGD results. In additions, adolescents also preferred consumed mixture of “cap tikus” with Pepsi and beer, “komix” mixed with M150, cowhide fungus and inhaled glue brand “fox”. “captikus” alcohol brand was a type of liquor contained 40% that produced by distillation process. Several adolescents bought alcohol by their own money. Some of adolescents also obtained alcohol by shared with their friend because they have no enough money to buy alcohol by themselves. Most of adolescents bought alcohol in stall or directly bought from retailer or sellers.

The behaviour was a predisposing factor that affected alcohol consumption pattern. The interview result showed that adolescents had positive attitude related to alcohol consumption. The teenagers also agreed that they felt happy, relieved stress, looked cool in their friend group when they consumed alcohol. The adolescents had experienced differences effect after alcohol consumption such as dizziness, shortness of breath, vomit, and became lazy. Based on FGD results, most of adolescents felt dizzy and vomited after consumed alcohol. The impact of alcohol consumption such as yelling, fights, some of adolescents had tried kill people and burn the house.

The adolescent’s father had experienced in alcohol consumption, their children tended to consume alcohol as their father. The parent inability to control their emotional made their children became bad temper and had an opportunity to consume alcohol to relieve burdens faced by their parents. The adolescents that lived together with their parents had good relationship with parents. The parent knew their children consumed alcohol would be controlled and supervised by their parents. Some of parents gave punishment to their children if they were consumed alcohol.

The community leader knew clearly alcohol consumption behaviour was very serious problem as many cases of accidents and death from alcohol consumption. An approach was introduced to community by optimized role of community leaders before new policy was drafted to limit sale of alcohol. In additions, there was cooperation with health officers also important to provide counselling about impact of alcohol consumption so that community aware harm of alcohol to their health. The lack of attention from community would create dilemma in new policy introduction.

Based on interview result showed health officer had good understanding toward alcohol. Many cases such as accident and death were due to alcohol consumption. The alcohol consumption in adolescents was serious issue and effort was needed to prevent increasing in number of teenagers consumed alcohol. The program was introduced for alcohol consumption behaviour prevention such as counselling in school to adolescent. There were many obstacles faced in program implementation because lack of cooperation from community itself. In additions, health officers claimed that they were faced difficulty to overcome alcohol consumption in community because their habit in consumed alcohol that had been adopted in their life.

One factor leads to alcohol consumption in adolescents because of availability of stalls and shop that sold alcoholic beverages. The access availability of alcoholic beverages leadsto the adolescent toward alcohol consumption behaviour. The number of shop and stalls that sold alcohol in public was due to high demand from community. The shops were often raided by police officers but there was nothing since socialization was given to alcohol seller. There was no official rule or regulation on prohibition of selling alcohol in public, so sellers were continued their alcohol selling to adolescents.

**Conclusion**

The cooperation from all peoples such as family, community leader, health officers and police officers were needed to control alcohol consumption behaviour in adolescents. The local government was suggested to introduce regulations about limitation in sale of alcohol publicly in stalls or agents that secretly sell alcohol to adolescents. The parent’s supervision toward their children’s activities at outside and their commitment
related to alcohol distribution in community. The health program about alcohol hazard was suggested to adolescents from local health officers.

Acknowledgment: The author extends the appreciation to all the participants and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References
5. World Health Organization (WHO). Adolescent development. [Internet]. [cited 2018 Nov 5]. Available from:
The Effect of Yellow Passion Fruit Peel Juice (Passiflora edulis f. flavicarpa deg.) on HDL and LDL Levels in Type 2 Diabetes Mellitus Patients in the Working Area of Teppo Health Centre Pinrang Regency

Dhuha Itsnanisa Adi1, Citrakesumasari1, Stang1
1Faculty of Public Health, Hasanuddin University, Jl. PerintisKemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia.

Abstract

The aim of this study to observe effect of passion fruit juice could change lipid profile (high density lipoprotein (HDL) and low density lipoprotein (LDL)) in diabetes mellitus patient. The study was conducted using quasi experiment with non-randomized pre and post study with control group. The sample was selected using purposive sampling method consisting of 40 participants and is divided to 2 groups included treatment and control group. The treatment group was given yellow passion fruit peel juice 250 ml/day with passion fruit juice recipe for 15 days and control group was only given passion fruit juice recipe. HDL and LDL levels were measured during pre and post study. HDL level in intervention group was increased about 6.85 mg/dL and in contrast, HDL level in control group was decreased of 8.50 mg/dL. There was no difference between treatment and control group. In treatment group, LDL level decreased in mean of 6.15 mg/dL and control group had increased with average of 2.8 mg/dL. The campaign on food consumption especially highlights the important for diverse and high fiber food in their daily dietary. The frequency of profile checks on diabetes patient to avoid greater risk of death from cardiovascular diseases (CVD) known as dyslipidemia. Further action will be taken with larger number of samples with longer duration of yellow passion fruit juice consumption.

Keywords: Diabetes mellitus; Lipid profile; Yellow passion fruit.

Introduction

Diabetes mellitus (DM) is classified by chronic hyperglycemia and impaired body metabolism causes by lack of insulin action1-3. The chronic hyperglycemia is correlated with long-term damage, abnormal, failure on many organs such as eye, kidneys, heart, nerves and blood vessels that lead to mortality and morbidity4. The diabetes cases had increased from 108 million in 1980 to 422 million in 20145. There is estimation of 1.6 million deaths due to diabetes diseases in 2015. Meanwhile, estimated 2.2 million deaths were due to high blood glucose6. DM risk was due to genetic, metabolic, ethnicity, family background in diabetes, age, obesity and overweight, unhealthy lifestyle, lack of physical exercise and smoking habit6.

The diabetes is main cause in premature mortality, due to correlate with cardiovascular (CV) disease also known as dyslipidemia7. An estimated 31.4% of death was due to CV diseases in 2012. Dyslipidemia is classified by presence of triglycerides, LDL and HDL8. The coronary artery disease risk in diabetes patients had contributed by abnormalities of serum lipid and determination of serum lipid levels in diabetics was considered standard of diabetes care10-12. In Sudan, a study found 250 DM patients had low HDL and high in triglycerides13. In few studies had found triglycerides, total cholesterol and LDL level are higher in people with diabetes mellitus compared control group14-17.
Passion fruit (Passiflora edulis) is native of tropical America belonged to Passifloraceae family had 530 species. In Indonesia, passion fruit found in South Sulawesi and North Sumatra and make syrup or juice. The passion fruit was contained high fiber help in body digestion and used in heartburn treatment about 65.22 gram of total fiber; 48.12 gram of insoluble fiber and 17.11 gram of water soluble fiber. Some studies had found passion fruit skin had positive result on glucose level and lipid profile. Based on benefit passion fruit, the authors had interested to conduct a study on effect of passion fruit juice changed lipid profile (HDL and LDL) in DM patients.

**Methodology**

The study was conducted using quasi experiment with non-randomized pre and posttest with control group. The sample was selected using purposive sampling method consisting of 40 participants and is divided to 2 groups included treatment and control group. The treatment group was given yellow passion fruit peel juice 250 ml/day with passion fruit juice recipe for 15 days, while control group was given passion fruit juice recipe. The passion fruit was selected and used proximate test such as ash, moisture, fiber, protein and carbohydrate content measurement. Fiber test, sugar test and pectin concentration on yellow passion fruit originated in Malakaji-Gowa. The formula for juice making was 40 gram of passion fruit albedo (this passion fruit albedo was gone through organoleptic test under preliminary study) with sugar and 200 milliliters. This mixture was blended and boiled for (±2 minutes). This fruit juice was given to intervention group with DM to observed effect of yellow passion fruit juice on lipid profile (HDL and LDL). HDL and LDL levels were measured before and after intervention. The data were analyzed by comparing result of lipid profile pre and post study using paired T test/ Wilcoxon and comparing treatment between two groups with independent T test/ Mann Whitney test.

**Result And Discussion**

**Univariate Analysis**

Table 1 showed the HDL level on intervention group was reduced from 50% to 35% after intervention period. Meanwhile, respondents had high HDL in pre study found increment in HDL level in post study from 50.0% to 65.0 %. Table 2 illustrates the LDL level was remaining unchanged for intervention group on before and after intervention period at 60%.

<table>
<thead>
<tr>
<th>HDL categories</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Low</td>
<td>10</td>
<td>50.0</td>
</tr>
<tr>
<td>High</td>
<td>10</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015

<table>
<thead>
<tr>
<th>LDL categories</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Low</td>
<td>12</td>
<td>60.0</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
<td>40.0</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015
**Bivariate Analysis**

In Table 3, the mean change of HDL level in intervention group was increased from 52.40 to 59.25, but statistically increment is not significant (p>0.05), which meant no difference in HDL levels before and after intervention. In control group as shown in Table 4, the mean HDL level was decreased from 70.55 to 62.05, but statistically not significant (p>0.05), which means no difference in HDL level before and after intervention. The mean rate of change in LDL level for intervention group was decreased from 146.6 to 140.45, but statistically reduction is not significant (p>0.05), no difference in LDL level before and after intervention. Meanwhile, mean of LDL level in control group was increased from 156.70 to 159.50 but statistically not significant (p>0.05), which meant no difference in LDL level before and after intervention. There was no difference changes for HDL and LDL between group after intervention (p>0.05).

Table 5 was showed mean difference of changes in HDL and LDL level between intervention and control group was not statistically significant, no difference of average difference of HDL and LDL level between intervention and control group.

### Table 3. Rate change between HDL and LDL level in intervention group before and after intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td></td>
<td>Mean± SD</td>
<td>Mean± SD</td>
</tr>
<tr>
<td>HDL</td>
<td>52.40± 16.76</td>
<td>59.25± 15.29</td>
</tr>
<tr>
<td>LDL</td>
<td>146.60± 33.59</td>
<td>140.45± 25.59</td>
</tr>
</tbody>
</table>

* paired T test

Source: Primary data, 2015

### Table 4. Rate change between HDL and LDL level in control group before and after intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>p value</th>
<th>Pp value (between group after intervention)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean± SD</td>
<td>Mean± SD</td>
<td></td>
</tr>
<tr>
<td>HDL</td>
<td>70.55± 25.45</td>
<td>62.05± 13.79</td>
<td>0.615**</td>
</tr>
<tr>
<td>LDL</td>
<td>156.70± 45.99</td>
<td>159.50± 48.13</td>
<td>0.740*</td>
</tr>
</tbody>
</table>

* paired T test

** Wilcoxon test

*** Independence T test

**** Mann Whitney

Source: Primary data, 2015

### Table 5. Average difference in HDL and LDL level between intervention and control group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Δ mean</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>HDL</td>
<td>↑6.85± 22.29</td>
<td>↓8.50± 27.76</td>
</tr>
<tr>
<td>LDL</td>
<td>↓6.15± 34.33</td>
<td>↑2.8± 37.22</td>
</tr>
</tbody>
</table>

* T Independence Test
**Mann Whitney Test**

Source: Primary Data, 2015

**Overall Discussion**

In this study found mean HDL level in intervention group after passion fruit peel juice of 250 ml increased from 52.40 mg/dL to 59.35 mg/dL, but statistically not significant (p>0.05). Meanwhile, mean of LDL level was decreased from 146.4 mg/dL to 140.45 mg/dL, but statistically not significant (p>0.05). A study found women aged 30-60 years had cholesterol level of ≥200 mg/dL showed decreased in LDL and total cholesterol after given passion fruit for 60 days25. In addition, another study also showed significant decreased in triglycerides and a significant increase in HDL level, but no reduction in total of cholesterol and LDL level in patients with diabetes mellitus after given yellow passion fruit flour26. Besides, mean of HDL level was observed increased, while LDL level was reduced in intervention group compared control group. This was due to effect of soluble fiber content in yellow passion fruit skin especially pectin. The pectin is formed a gel-like substance in stomach and provided a feeling of anxiety and delayed carbohydrate absorption27. In additions, pectin is helped in reducing total plasma cholesterol level, triglycerides and LDL and increased HDL level. Therefore, fiber consumption was reduced risk for diseases such as dyslipidemia, diabetes, obesity and cardiovascular diseases (CVD) 28, 29. The fiber had significantly reduced LDL level and increased HDL level20, 31. In additions, another study demonstrated passion fruit juice increased HDL levels and reduce total cholesterol, LDL level and free fatty acid level27. The presence of flavonoids in passion fruit had contributed in HDL level increment.

The pectin content in the passion fruit juice given to the intervention group was 2.75 grams which was theoretically gave the effect on the lipid profile. In this study, intervention was done for 15 days and result showed no tendency in LDL level decreased and increased in HDL level significantly. Therefore, short intervention period was one factor caused no significant change in the lipid profile result as hypothesized. Besides diet, nutritional status and physical activity also affected to lipid profile27. The nutritional status and physical activity between two groups was no changed. Thus, trend of increasing HDL levels and decreased LDL levels occurred in the intervention group compared with control group was due to effect of yellow passion fruit juice.

**Conclusion**

In conclusions, HDL level in intervention group was increased about 6.85mg/dL and in contrast, HDL level in control group was decreased of 8.5 mg/dL. There was no difference between treatment and control group. In treatment group, LDL level decreased in mean of 6.15 mg/dL and control group increased with average of 2.8 mg/dL. The campaign on diabetes patient to avoid greater risk of death from cardiovascular diseases (CVD) known as dyslipidemia. Further action will be taken with larger number of samples with longer duration of yellow passion fruit juice consumption.

**Acknowledgment:** The author would like to acknowledge to all the participants and Faculty of Public Health, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

6. World Health Organization (WHO). Global report on diabetes. [Internet]. 2016; [cited 2018...
DOI:10.1016/j.amjmed.2013.06.007


26. Janebro DI, Queiroz MS, Ramos AT, Sabaa-Srur AU, Cunha MA, Diniz MF. Effect of the flour of the yellow passion fruit peel (PassifloraEdulis F. Flavicarpa Deg.) in the glycemic and lipid levels


The Effect of Giving VCO (Virgin Coconut Oil) on the Nutritional Status of Under Nutrition Children Aged 24-58 Months Old in Bontoramba Subdistrict Jeneponto Regency

Diesna Sari¹, Rahayu Indriasari¹, Andi Zulkifli¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study to determine effect of VCO on nutritional status based on body weight and nutrient intake among under nutrition children aged 24-58 months old in Bontoramba subdistrict, Jeneponto regency. The study was conducted as a true experiment that using randomized pre and post test with control group. The samples (72 under-nutrition children aged 24-58 months) were selected using probability sampling method based on the indicator of bodyweight/age. The respondents were divided into two groups: treatment and control groups. The treatment group was given Virgin Coconut Oil (VCO) and supplement biscuits; while control group was just given supplement biscuits for two months. The body weight and nutrient intake were measured before the intervention; and at the first month and second months after intervention. The result showed that treatment group experienced an increase of bodyweight of 0.68 kg on average; while control group experienced an increase of body weight of 0.58 kg on average. The nutrition intake (energy, protein, fats, carbohydrates and fibre) in treatment and control group increased significantly on average (p ≤ 0.05), and a significant difference between two groups (p≤ 0.05). Therefore, no difference between treatment and control group in bodyweight, but difference was observed in nutrient intake for both groups.

Keywords: Children under five years old; Under nutrition; Virgin coconut oil.

Introduction

Under nutrition is determined in malnutrition. There are 4 types under nutrition such as wasting, stunting, underweight and vitamins and minerals deficiency¹. Under nutrition leads children in more susceptible to disease and mortality. An estimated 3 million children were died due to under nutrition for every year². There was also 45% of death in children age under 5 years old due to under nutrition occurs in low- and middle-income countries. In South Asia, high prevalence had observed for stunting (38%), underweight (32%) and wasting (16%) compared to other region in world³. The children malnutrition was health problem in the children that contributed to increment in morbidity and mortality, disrupted the intellectual development, non-productive in adult and even increased risk for many diseases⁴.

The malnutrition is due to several factors: poor in dietary intake and/or infectious diseases, environmental and socioeconomic factors⁵,⁶. Few studies in China and Vietnam found low birth weight, parities, pre term birth, maternal education, and low family income are correlated with malnutrition in children⁷,⁸,⁹. Meanwhile, factors such as gender, age, marital status, maternal education, family income, decision making, parities, feeding mode, accessible to clean water and house condition had influenced malnutrition in children under 5 years old in Ethiopia¹⁰,¹¹. In addition, a study suggested risk factors for under nutrition among children were livestock dispossession, food taboo and wrong eating in families, poor and early marriage of mothers and lack of health/nutrition education, had contributed in malnutrition among children under 5 years old¹¹.

In contrast, a study found male sex, parents’ educational status, preterm babies, monthly family...
income, diarrhoea, and respiratory infection and had no antenatal follow-up was no significantly influenced malnutrition among children in Northwest Ethiopia\textsuperscript{12}. In a study determined high probability boys experienced underweight, while girls were common with stunting since boys had higher weight and height compared to girl at same age\textsuperscript{13}. The malnutrition for children under 5 years had assessed by height and weight measurement. Based on World Health child growth standard 2006, malnutrition was determined by weight for age (underweight), height for age (stunting) and weight for height (wasting)\textsuperscript{3}.

The virgin coconut oil (VCO) is defined as oil from fresh and mature kernel of coconut (Cocosnucigera L.) through mechanical or natural\textsuperscript{14}. VCO had chain fatty acid that maintained healthy heart and resource for energy and fat-soluble vitamins\textsuperscript{15}. The impact of coconut oil on health included cancer, cardiovascular diseases, brain, liver, body weight, and infection\textsuperscript{16,17}. An experimental study showed animal fed with VCO had increment in high-density lipoprotein (HDL) and reduced in low-density lipoprotein (LDL) and total cholesterol\textsuperscript{17}. Meanwhile, VCO had increased body weight compared to soybean oil among children\textsuperscript{18}.

This study was aiming to determine effect of VCO on nutritional status based on body weight and nutrient intake among under nutrition children aged 24-58 months old in Bontorambasubdistrict, Jeneponto regency.

**Methodology**

The study was conducted as a true experiment by using randomized pre and post test with control group. The samples (72 under-nutrition children aged 24-58 months) were selected using probability sampling method based on indicator of bodyweight/age. There were divided into two groups: treatment and control groups. The treatment group was given Virgin Coconut Oil (VCO) and supplement biscuits; while control group was just given supplement biscuits for two months.

In pre-intervention, data in form of characteristics, body weight, nutritional status, dietary intake and appetite were taken for both groups. The VCO was consumed for 3 times per day with supplement biscuits in treatment group. The first and second months, measurement of bodyweight, nutritional status, dietary intake and appetite were taken for both groups. The primary data was obtained directly from observation during intervention period, while secondary data were collected from health centre such as nutritional status report, demographic conditions, village and sub district profile from related government agencies.

The data were analysed using SPSS program to find out change of bodyweight and nutrient intake after intervention by using Repeated Annova/Friedman test. In addition, treatments of groups were compared by using independent T-test/mann Whitney. Hypothesis test of analysis result used 95% confidence level ($\alpha = 0.05$), where hypothesis was accepted when $p<0.05$.

**Result and Discussion**

**Bivariate Analysis**

The study was carried out on 76 under-nutrition childrens that aged under 5 years old and those samples were grouped into two groups: treatment group (39 childrens) and control group (37 childrens). This study found treatment group experienced an increase of bodyweight of 0.68 kg on average; while control group experienced an increase of bodyweight of 0.58 kg on average. Both groups showed significantly decreased in average Z-score at ($p<0.05$). However, difference in average reduction in Z-score was higher in treatment group of 0.33. Table 2 showed there was significant increase in body weight (p<0.05) in treatment group and control group after intervention. Based on Diagram 2, proportion of body weight changes in treatment group was higher than control group for 1%. The body weight was higher in treatment group, 0.68kg compared to control group, 0.58 kg.

Table 3 showed ratio of body weight of sample in pre, post 1, post 2 between treatment and control group did not showed statistically significant result ($p>0.05$) which meant no significant difference in body weight between both group. Table 4 showed there was increased of median mean score in treatment group significantly ($p<0.05$) but control group’s result obtained was not significant ($p>0.05$). The test result among group showed a significant increased (p <0.05) in treatment group compared to control group related to dietary behaviour (appetite). Table 5 showed significant differences in dietary change in both treatment and control group between pre-intervention, during first month intervention (Post 1) and after second month intervention (Post 2), indicated by p-value<0.05. There was no significant difference between treatment group and control group.
The nutrition intake (energy, protein, fats, carbohydrates and fiber) in treatment group and control group increased significantly on average (p ≤ 0.05), and there was a significant difference between two groups (p<0.05). Therefore, there was no difference between treatment group and control group in bodyweight, but difference was observed between treatment and control group in nutrient intake.

Table 1. Average Z-score changes before and after intervention in treatment and control group

<table>
<thead>
<tr>
<th>Group</th>
<th>∆ Mean</th>
<th>p-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td></td>
</tr>
<tr>
<td>Treatment (n=36)</td>
<td>-2.46± 0.29</td>
<td>-2.12± 0.40</td>
<td>0.00*</td>
</tr>
<tr>
<td>Control (n=36)</td>
<td>-2.44± 0.27</td>
<td>-2.21± 0.40</td>
<td>0.00*</td>
</tr>
<tr>
<td>p-value</td>
<td>0.845**</td>
<td>0.390**</td>
<td></td>
</tr>
</tbody>
</table>

* Paired T-test

** Independence T-test

Source: Primary data, 2015

Diagram 1. Graph of average Z-score comparison in both groups before and after intervention

Table 2. Mean of body weight change of samples in treatment and control group before and after intervention

<table>
<thead>
<tr>
<th>Group</th>
<th>Body Weight (Mean ± SD)</th>
<th>Δ Mean</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post 1</td>
<td>Post 2</td>
</tr>
<tr>
<td>Treatment (n=36)</td>
<td>10.86± 1.06</td>
<td>11.38±1.11</td>
<td>11.55± 1.19</td>
</tr>
<tr>
<td>Control (n=36)</td>
<td>10.92± 1.45</td>
<td>11.44± 1.4</td>
<td>11.51± 1.53</td>
</tr>
</tbody>
</table>

* Repeated Anova test

Source: Primary data, 2015
Table 3. Comparison of body weight before and after virgin coconut oil (VCO) consumption between both groups

<table>
<thead>
<tr>
<th>Body Weight (kg)</th>
<th>Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
</tr>
<tr>
<td>Pre (Mean ± SD)</td>
<td>10.86± 1.06</td>
<td>10.92± 1.45</td>
</tr>
<tr>
<td>Post 1 (Mean ± SD)</td>
<td>11.38± 1.11</td>
<td>11.44± 1.4</td>
</tr>
<tr>
<td>Post 2 (Mean ± SD)</td>
<td>11.55± 1.19</td>
<td>11.51± 1.53</td>
</tr>
</tbody>
</table>

* Independence T test
Source: Primary data, 2015

Table 4. Dietary Behaviour Score (appetite) for children who experienced under nutrition before and VCO consumption

<table>
<thead>
<tr>
<th>Group</th>
<th>Score (Median)</th>
<th>ΔMedian</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post 1</td>
<td>Post 2</td>
</tr>
<tr>
<td>Treatment (n=36)</td>
<td>59.5</td>
<td>78.0</td>
<td>81.5</td>
</tr>
<tr>
<td>Control (n=36)</td>
<td>66.5</td>
<td>70.5</td>
<td>74.5</td>
</tr>
</tbody>
</table>

*p-value

**Friedman Test
** Repeated Anova Test
*** Mann-Whitney Test
Source: Primary data, 2015
Table 5. Mean intake changes in treatment group before and after intervention

<table>
<thead>
<tr>
<th>Intake</th>
<th>Treatment (n=36)</th>
<th></th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post 1</td>
<td>Post 2</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>807.11± 270.64</td>
<td>1475.41± 342.52</td>
<td>1533.99± 302.45</td>
<td>0.000*</td>
</tr>
<tr>
<td>Protein</td>
<td>24.62± 12.43</td>
<td>43.60± 12.83</td>
<td>47.30± 11.37</td>
<td>0.000*</td>
</tr>
<tr>
<td>Fat</td>
<td>25.59± 10.96</td>
<td>58.99± 15.74</td>
<td>61.01± 14.74</td>
<td>0.000*</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>118.85± 46.42</td>
<td>184.65± 56.29</td>
<td>191.17± 44.10</td>
<td>0.000*</td>
</tr>
<tr>
<td>Fibre</td>
<td>4.19± 2.86</td>
<td>9.00± 3.62</td>
<td>8.86± 2.78</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*Friedman Test

** Repeated Anova Test

Source: Primary data, 2015

Table 6. Mean intake changes in control group before and after intervention

<table>
<thead>
<tr>
<th>Intake</th>
<th>Control (n=36)</th>
<th></th>
<th></th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post 1</td>
<td>Post 2</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>948.71± 334.01</td>
<td>1215.17± 327.01</td>
<td>1156.72± 288.45</td>
<td>0.01**</td>
</tr>
<tr>
<td>Protein</td>
<td>30.21± 14.00</td>
<td>39.79± 11.97</td>
<td>38.45± 13.55</td>
<td>0.00**</td>
</tr>
<tr>
<td>Fat</td>
<td>30.21± 15.83</td>
<td>41.82± 11.31</td>
<td>38.13± 8.93</td>
<td>0.02</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>141.60± 49.79</td>
<td>163.14± 55.31</td>
<td>159.12± 55.46</td>
<td>0.04*</td>
</tr>
<tr>
<td>Fibre</td>
<td>4.58± 2.52</td>
<td>8.08± 3.36</td>
<td>7.53± 4.78</td>
<td>0.00*</td>
</tr>
</tbody>
</table>

*Friedman Test

** Repeated Anova Test

Source: Primary data, 2015

Overall Discussion

There was significant increase in p<0.05 p=0.05 in average change of sample weight in treatment group compared to control group. However, average difference of children weight gain is higher in treatment group, 0.68 kg with proportion of change of 6.3% with difference of 1% from control group. Besides, there was a changed of mean Z-score according to body weight/age before and after intervention. Both groups experienced a significant decrease in mean Z-score (p<0.05). The treatment group had achieved high score about 0.33. Meanwhile, VCO consumption had reduced body weight and fat in adult19, 20. In contrast, a study had found that heated VCO had increased body weight in rats compared to non-heated oil-fed group21.

The comparison of body weight before pre-intervention, one month after intervention (post 1), and second month after intervention (Post 2) between both group had increased but not statistically significant (p>0.05), no real difference between two groups in term of body weight. This study also found significant differences in dietary change in treatment and control group prior to pre intervention, during first month intervention (Post 1) and after second month intervention (Post 2) (p<0.05). There was an increment in nutrient intake which included energy, protein, fat, carbohydrates and fibre in both groups. VCO supplement had improved nutritional status by increased body weight among children less than 5 years. VCO is suitable for children had indigestion and difficulty in nutrient absorption. VCO had improved body metabolism system for better nutrient absorption22. VCO had non-hydrogenated fatty acids such as lauric acid, medium saturated with medium carbon chain was called medium chain fatty acid (MCFA). The MCFA absorption was faster and efficient compared long-chain fatty acids (LCFA)20. The
lauric acid was most effective in antimicrobial agents for foods and cosmetics.

Furthermore, the comparison of average intake among treatment with control group during second month (Post 2) found mean comparison of all intake included energy, protein, fat, carbohydrate and fibre experienced significant difference between groups in second month after intervention (Post 2) with p<0.05. There was no significant difference in intake between treatment and control group before intervention with p>0.05. Form this study, virgin coconut oil consumption in these underweight children increased nutritional intake and had better appetite than control group. A study showed no significant difference in body weight gains and liver for VCO consumption.

The virgin coconut oil might be an alternative way to provide enough nutrients for children under five years old that experienced malnutrition.

Conclusion

In conclusions, average changes in body weight occur in treatment and control group after intervention period, with statistically significant test result for both groups. The difference in mean children’s weight gain is higher in treatment group but statistically did not showed significant result. There was a change of average of nutrition intake (energy, protein, fat, carbohydrate and fibre) with statistical test result obtained significant result. Besides, difference also observed in average changes in nutrition intake (energy, protein, fat, carbohydrate and fibre) showed significant increase in nutritional intake in treatment group. Hence, VCO had recommended increasing nutritional intake and appetite of children under five years old.

Acknowledgment: The author would like to thank to all participants and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Relationship between Yoga Exercise for Trimester III Pregnancy and Fetal Outcomes at Restu Maternity Hospital Makassar

Eggy Widya Larasati¹, Nasrudin A. M¹, Budu¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

There are 5 million neonatal mortality had recorded in developing countries every year with neonatal mortality rate (NMR) 39 per 1000 live births compared to more developed countries with 7 per 1000 live births. Several factors contributed to neonatal mortality such as maternal weight, age and neonatal factors included infants’ birth weight, hypothermia, asphyxia, gap from previous pregnancy and congenital disorder. The study aims to determine relationship between yoga exercise for third trimester pregnancy and fetal outcomes (birth weight, at Restu Maternity Hospital Makassar. The study was used quasi experiment with two group post-tests. The study population were primigravida women who were in their third trimester pregnancy, performed pregnancy yoga and gave birth in June to July 2015. The sample sizes were 50 respondents which selected by using purposive sampling. The data was obtained by using observation sheet of pregnancy yoga exercise, infant birth weight, APGAR score and ballard score in intervention group. The data were analysed using Spearman’s rho and Mann Whitney. The statistical test showed birth weight had obtained p=0.004 and ballard maturation, p=0.002.

Keywords: APGAR score; Ballad maturation score; Birth weight; Yoga.

Introduction

There are 5 million neonatal mortality had recorded in developing countries every year with neonatal mortality rate (NMR) 39 per 1000 live births compared to more developed countries with 7 per 1000 live births¹. Half of neonatal mortality occurred in DR Congo, Nigeria, Ethiopia, Uganda and Tanzania². Several factors contributed to neonatal mortality such as maternal weight, age and neonatal factors included infants’ birth weight, hypothermia, asphyxia, gap from previous pregnancy and congenital disorder³⁴. Yoga is defined as “union” in Sanskrit word which originated from India and written in Yoga Sutra by Patanjali⁵⁶. The yoga practices lead balance in emotional, mental, spiritual dimension and physical which involved postures (asana), breathing exercise (pranayama), concentration and meditation (dharana and dhyana)⁷⁸. The yoga benefit in helped mother well-being and improved normal pregnancy and birth labour chances⁹. An estimation of 35% of women aged between 28 years and 33 years who practiced yoga had reduced maternal experience of anxiety, pain, stress, discomfort as well as birth delivery and fetal outcomes¹⁰. The study aims to determine relationship between yoga exercise for trimester III pregnancy and fetal outcomes at Restu Maternity Hospital Makassar.

Methodology

Study design

The study was used a quasi-experimental research design with two groups post-test (intervention and control groups) to determine relationship between yoga exercise for trimester III pregnancy and fetal outcomes (birth weight, APGAR score and ballard score).

Study location and time

The study was conducted from June to July 2015 at Restu Maternity Hospital in Makassar.
Study population and sample

The study population were primigravida women who were in their third trimester pregnancy and performed pregnancy yoga exercise during the study. The sample sizes were 50 respondents (25 respondents in intervention group and 25 respondents in control group) by using purposive sampling technique.

Data collection

The data was obtained by using observation sheet of pregnancy yoga exercise, infant birth weight, APGAR score and Ballard score in intervention group.

Data analysis

The data was analysed using SPSS program. The bivariate analysis had used Spearman’s rho and Mann Whitney test to compare differences in outcome between mothers who practice pregnancy yoga and mothers who did not practice pregnancy yoga.

Results and Discussion

Univariate Analysis

Based on Table 1, 7 respondents (28%) who did not practice pregnancy yoga had infants with low birth weight which less than 2500 gram. Based on Spearman’s Rho test, there is significant relationship between birth weight with pregnancy yoga exercise on third trimester pregnant at Restu Maternity Hospital in Makassar.

There were 24 respondents (96.0%) had normal APGAR score and a respondent had mild asphyxia in the intervention group, while 16 respondents (64.0%) had normal APGAR score and 9 respondents (34.0%) had mild asphyxia in APGAR score. The statistical test found significant relationship between pregnancy yoga exercise on third trimester pregnant women with APGAR score at Restu Maternity Hospital Makassar.

Table 1. Relationship between pregnancy yoga exercise on third trimester pregnant women with birth weight at Restu Maternity Hospital in Makassar year 2015

<table>
<thead>
<tr>
<th>Birth weight (gram)</th>
<th>Pregnancy yoga exercise</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>2500-4000</td>
<td>25</td>
<td>100</td>
<td>18</td>
</tr>
<tr>
<td>&lt;2500</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 2. Relationship between pregnancy yoga exercise on third trimester pregnant women with APGAR score at Restu Maternity Hospital in Makassar year 2015

<table>
<thead>
<tr>
<th>APGAR score</th>
<th>Pregnancy yoga exercise</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Normal</td>
<td>24</td>
<td>96.0</td>
<td>16</td>
</tr>
<tr>
<td>Mild asphyxia</td>
<td>1</td>
<td>4.0</td>
<td>9</td>
</tr>
</tbody>
</table>
Bivariate Analysis

Based on Table 3, there were 25 respondents (100%) who had normal or mature Ballard maturation score for respondents with pregnancy yoga exercise, while 17 respondents (68.0%) had normal or mature Ballard maturation score for respondents who did not practice pregnancy yoga exercise. Meanwhile, 8 respondents (32.0%) had dysmature Ballard maturation score for respondents who did not practice pregnancy yoga exercise. The statistical test showed significant relationship between pregnancy yoga exercise on third trimester pregnant women and Ballard maturation score at Restu Maternity Hospital Makassar.

There were differences on fetal outcomes (birth weight, APGAR score and Ballard maturation score) between respondents who practiced pregnancy yoga exercise and respondents who did not practiced pregnancy yoga exercise. Based on Mann Whitney statistical test showed p 0.004 <0.05 with mean rank in control group of 29.0 which higher than mean rank in intervention group which is 22.00. Besides, mean rank in control group was higher than mean rank of intervention group by different of 0.800. The difference of mean rank in Ballard score between respondents who practiced pregnancy yoga exercise and respondents who did not practiced pregnancy yoga exercise.

Table 3. Relationship between pregnancy yoga exercise on third trimester pregnant women with Ballard score at Restu Maternity Hospital in Makassar year 2015

<table>
<thead>
<tr>
<th>Ballard maturation score</th>
<th>Pregnancy yoga exercise</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Mature</td>
<td>25</td>
<td>100</td>
<td>17</td>
</tr>
<tr>
<td>Dysmature</td>
<td>0</td>
<td>0.0</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 4. Differences in fetal outcome (birth weight, APGAR score and Ballard maturation score) between respondents who performed pregnancy yoga exercise and respondents who did not performed pregnancy yoga exercise at Restu Maternity Hospital 2015

<table>
<thead>
<tr>
<th>Mean Rank</th>
<th>Pregnancy yoga exercise</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Birth Weight</td>
<td>22.00</td>
<td>29.00</td>
</tr>
<tr>
<td>APGAR score</td>
<td>21.50</td>
<td>29.50</td>
</tr>
<tr>
<td>Ballard maturation score</td>
<td>21.50</td>
<td>29.50</td>
</tr>
</tbody>
</table>

Overall Discussion

The study found 25 respondents (100%) who practiced pregnancy yoga exercise gave birth to infant with normal weight which birth weight ranged between 2500 and 400 grams. Meanwhile, 18 respondents (72.0%) who did not practice pregnancy yoga exercise had deliver infants with normal birth weight and only 7 respondents (28.0%) had delivered infants with low birth weight. A study by Narentran, et al. showed pregnant women with yoga exercise for one hour daily had significant increased in birth weight more than 2500 grams and lower rate in premature labour16.

APGAR score is simple method used by midwife to assess health of new born infants. APGAR score is rated from zero to ten. Majority of respondents had normal APGAR score, 24 respondents (96.0%) and only one respondent had mild asphyxia for respondent who had practiced pregnancy yoga exercise. Asphyxia
is condition where infants had difficulty in breath after births. The asphyxia also occurs due to lack of blood flow through placenta lead to low oxygen to the fetus. The birth asphyxia also caused by maternal age, multiple births, lack in antenatal care visits, low birth weight infants, prolonged membrane ruptures, meconium stained fluid, malpresentation, partum haemorrhage, pre-eclampsia and severe eclampsia, intrapartum anaemia and ante partum.\textsuperscript{17}

The ballard maturation score is accurate assessment tool on fetal maturity degree for precise interpretation which not gestation age calendar once beyond 36 weeks.\textsuperscript{18} The study found all respondents who practiced pregnancy yoga had normal or mature Ballard maturation score and 8 respondents (32.0\%) who did not practice pregnancy yoga exercise had dysmature Ballard maturation score. There is significant relationship between pregnancy yoga exercise on third trimester pregnant women and Ballard maturation score.

Furthermore, the statistical test result showed differences between fetal outcomes (birth weight, APGAR score and Ballard maturation score) between mothers who practiced pregnancy yoga and mothers who did not practiced pregnancy yoga. Several studies found pregnancy yoga exercise had influenced fetal outcome which using different method and comparison standards. The pregnancy yoga is effective therapy in decrease hypertensive complications and improving fetal outcomes\textsuperscript{14,19}. In additions, another study also suggested yoga had shorten first stage of birth delivery duration and total time of birth delivery\textsuperscript{20}. The regular yoga exercise during last 10 to 12 weeks of pregnancy had increased maternal comfort during birth delivery and improved birth delivery process\textsuperscript{21}. The pregnant women who performed regularly exercise helped in maintain pelvic ligament strength, hips and legs muscles, hence reducing pain during labour, improving maternal comfort at 2 hours post-saline and facilitate the birth delivery. Meanwhile, a study found practicing yoga in early second trimester pregnant women helped in reduced physical pain but increased pain among third trimester pregnant women\textsuperscript{22}. In additions, yoga also decreased stress, anxiety and depression among pregnant women\textsuperscript{23-25}. The yoga exercise also improve concentration, reduced fatigue, increase stamina and reduce stress by 32%.

Acknowledgement: The author would like to thank to Restu Maternity Hospital in Makassar for information support and Faculty of Medicine, Hasanuddin University for unconditionally support.

Conclusion

In conclusions, the pregnancy yoga exercise on third trimester pregnant women helped increased birth weight, APGAR score and Ballard maturation score although several other factors also contributed to fetal outcomes.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Relationship between Premenstrual Coping and Premenstrual Syndrome (PMS) among Female Midwifery Students in Kendari Health Polytechnic

Farming¹, Nasrudin A. M¹, Budu¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

The study aims to determine relationship between premenstrual coping and premenstrual syndrome among midwifery students in Kendari Health Polytechnic. The study was used an observational study with cross sectional study design. The study population were all female midwifery students in Kenari Health Polytechnic. The sample sizes were 155 respondents and selected by using stratified random sampling method. The data were analysed using statistical test by Spearman correlation test. The statistical test showed premenstrual coping with PMS among female midwifery students had obtained p=0.020. Meanwhile, premenstrual coping dimension of avoiding harm had obtained had obtained p=0.014, awareness and acceptance of premenstrual (p=0.016), adjusting energy (p=0.064), self-care (p=0.003) and communicating (p=0.991).

Keywords: Adaptive; Body mass index; Malative; Menstrual cycle.

Introduction

Most women of reproductive age had experienced some physical dysphoria or discomfort in the weeks before their menstruation¹. Premenstrual syndrome (PMS) is defined by intermittent, moderate-to-severe affective, physical and behavioural symptoms which occurred during luteal menstrual cycle and disappear within a few days of menstruation². PMS is very common among adolescence and young women. PMS had affected 20% until 80% of women of reproductive age and varies among women in term of severity and duration of PMS from cycle to cycle³. The cause of PMS is still unknown and many researchers believed PMS was due to estrogen and progesterone hormone level changes.

There are more than 200 symptoms are related with PMS⁴. Most common physical symptoms for PMS included pimples, abdominal bloating, breast tenderness, fatigue, appetite changes, sleep disturbances, headaches, while emotional symptoms included mood swinging, crying, anxiety, irritability, oversensitivity, tension and depression³⁵⁷. Severe of PMS is known as premenstrual dysphoric disorder (PMDD). About 2% to 6% of women were suffered with PMDD in their lifespan⁵. Women with PMDD had experienced anger, irritability and other mood symptoms included sleep disorders such as insomnia, non-restoration of sleep and frequent night time awakening which affected their daily life⁸.

Few studies had been done to determine relationship between coping ways with premenstrual syndrome, coping with premenstrual changing and correlated psychosocial factors in premenstrual dysphoria with coping process⁹¹³. In this study, Premenstrual Coping Measure (PMCM) consisted of five subscales such as Avoiding Harm, Awareness and Acceptance of Premenstrual Changes, Adjusting Energy, Self-care and Communicating had been examined to correlate with PMS among female midwifery students in Kendari Health Polytechnic.

Methodology

Study design: The study was used an observational study with cross sectional study design.

Study location and time: The study was conducted in November to December 2014 at Kendari Health Polytechnic.
**Study population and sample:** The study population were all female midwifery students of Kendari Health Polytechnic. The sample sizes were 155 respondents which obtained by stratified random sampling method.

**Data analysis:** The bivariate analysis was used to determine dependent variable (PMS) and independent variable (premenstrual coping) by using Spearman correlation test.

**Results and Discussion**

**Bivariate Analysis**

Based on Table 1, 51 respondents (66.2%) who had maladaptive in premenstrual coping were experienced PMS, while 48 respondents (61.5%) had adaptive in premenstrual coping did not experienced PMS. The statistical test found there was significant relationship between premenstrual coping and PMS among female midwifery students in Kendari health Polytechnic.

For avoiding harm, there were 48 respondents (64.0%) had maladaptive avoiding harm and 33 respondents (41.2%) had adaptive avoiding harm with PMS. Meanwhile, 25 respondents (32.5%) had maladaptive and 49 respondents (62.8%) had adaptive in awareness and acceptance of premenstrual without suffered PMS. There were 45 respondents (68.2%) had maladaptive and 36 respondents (40.4%) had adaptive in adjusting energy with suffered in PMS. There were 52 respondents (58.4%) had adaptive with suffered PMS and 37 respondents (41.6%) had adaptive without suffered PMS in self-care. In additions, 44 respondents (58.7%) had maladaptive in communicating with suffered PMS and 31 respondents (41.3%) had maladaptive in communicating without suffered PMS.

<table>
<thead>
<tr>
<th>Premenstrual coping</th>
<th>PMS</th>
<th>Total</th>
<th>ρ*</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Maladaptive</td>
<td>51</td>
<td>66.2</td>
<td>26</td>
<td>33.8</td>
</tr>
<tr>
<td>Adaptive</td>
<td>30</td>
<td>38.5</td>
<td>48</td>
<td>61.5</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
<td>52.3</td>
<td>74</td>
<td>47.7</td>
</tr>
</tbody>
</table>

Table 1. Relationship between premenstrual coping with PMS among female midwifery students in Kendari Health Polytechnic

<table>
<thead>
<tr>
<th>Premenstrual coping dimension</th>
<th>PMS</th>
<th>Total</th>
<th>ρ*</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Avoiding harm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maladaptive</td>
<td>48</td>
<td>64</td>
<td>27</td>
<td>58.8</td>
</tr>
<tr>
<td>Adaptive</td>
<td>33</td>
<td>41.2</td>
<td>47</td>
<td>64.0</td>
</tr>
<tr>
<td>Awareness and acceptance of</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>premenstrual</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maladaptive</td>
<td>52</td>
<td>67.5</td>
<td>25</td>
<td>32.5</td>
</tr>
<tr>
<td>Adaptive</td>
<td>29</td>
<td>37.2</td>
<td>49</td>
<td>62.8</td>
</tr>
</tbody>
</table>
Continued Table 2. Relationship between premenstrual coping dimension with PMS among female midwifery students in Kendari Health Polytechnic

<table>
<thead>
<tr>
<th></th>
<th>Maladaptive</th>
<th>Adaptive</th>
<th>ρ*</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusting energy</td>
<td></td>
<td></td>
<td>0.064</td>
<td>-0.149</td>
</tr>
<tr>
<td>Maladaptive</td>
<td>45</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive</td>
<td>68.2</td>
<td>40.4</td>
<td>21</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>31.8</td>
<td>59.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-care</td>
<td></td>
<td></td>
<td>0.003</td>
<td>-0.234</td>
</tr>
<tr>
<td>Maladaptive</td>
<td>29</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive</td>
<td>43.9</td>
<td>58.4</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>56.1</td>
<td>41.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicating</td>
<td></td>
<td></td>
<td>0.991</td>
<td>-0.001</td>
</tr>
<tr>
<td>Maladaptive</td>
<td>44</td>
<td>37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adaptive</td>
<td>58.7</td>
<td>46.2</td>
<td>31</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>41.3</td>
<td>53.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Multivariate Analysis

Based on Table 3, half of respondents had PMS aged 20 years old, 40 respondents (51.3%) and none of respondent had PMS who aged 16 years old. There was no significant relationship between age and PMS among female midwifery students in Kenari Health Polytechnic. Meanwhile, 65 respondents had first menstrual bleeding below than 12 years old with suffered PMS and 16 respondents (53.3%) had first menstrual bleeding above than 12 years with suffered PMS. Based on statistical test found no significant relationship between age of menarche and PMS. In additions, there were 65 respondents (52.0%) had menstrual cycle between 21 days and 35 days and 3 respondents (42.9%) had menstrual cycle less than 21 days. None respondents had menstrual period less than 3 days and most of respondents had menstrual period between 3 days and 7 days with suffered PMS, 76 respondents (53.1%). There were 57 respondents (50.4%) had their frequency in changing period pad between 3 times and 5 times per day and only 3 respondents (60%) had their frequency in changing period pad more than 5 times with suffered PMS. Furthermore, respondents who suffered PMS, there were 51 respondents (50.5%) had normal nutritional status and only 6 respondents with obesity status. Based on statistical test, menstrual cycle, menstrual bleeding duration and menstrual bleeding quantity had no significant relationship with PMS. In contrast, only nutritional status had significant correlated with PMS.

Table 3. Relationship between respondent characteristic and PMS among female midwifery students in Kendari Health Polytechnic

<table>
<thead>
<tr>
<th>Respondent characteristic</th>
<th>PMS</th>
<th>ρ*</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>10</td>
<td>62.5</td>
<td>6</td>
</tr>
<tr>
<td>18</td>
<td>40</td>
<td>51.3</td>
<td>38</td>
</tr>
<tr>
<td>19</td>
<td>23</td>
<td>50.0</td>
<td>23</td>
</tr>
<tr>
<td>20</td>
<td>7</td>
<td>58.3</td>
<td>5</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>Age of menarche</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12 years</td>
<td>65</td>
<td>52.0</td>
<td>60</td>
</tr>
<tr>
<td>≤ 12 years</td>
<td>16</td>
<td>53.3</td>
<td>14</td>
</tr>
</tbody>
</table>

Based on Table 3, half of respondents had PMS aged 20 years old, 40 respondents (51.3%) and none of respondent had PMS who aged 16 years old. There was no significant relationship between age and PMS among female midwifery students in Kenari Health Polytechnic. Meanwhile, 65 respondents had first menstrual bleeding below than 12 years old with suffered PMS and 16 respondents (53.3%) had first menstrual bleeding above than 12 years with suffered PMS. Based on statistical test found no significant relationship between age of menarche and PMS. In additions, there were 65 respondents (52.0%) had menstrual cycle between 21 days and 35 days and 3 respondents (42.9%) had menstrual cycle less than 21 days. None respondents had menstrual period less than 3 days and most of respondents had menstrual period between 3 days and 7 days with suffered PMS, 76 respondents (53.1%). There were 57 respondents (50.4%) had their frequency in changing period pad between 3 times and 5 times per day and only 3 respondents (60%) had their frequency in changing period pad more than 5 times with suffered PMS. Furthermore, respondents who suffered PMS, there were 51 respondents (50.5%) had normal nutritional status and only 6 respondents with obesity status. Based on statistical test, menstrual cycle, menstrual bleeding duration and menstrual bleeding quantity had no significant relationship with PMS. In contrast, only nutritional status had significant correlated with PMS.
**Table 3. Relationship between respondent characteristic and PMS among female midwifery students in Kendari Health Polytechnic**

<table>
<thead>
<tr>
<th></th>
<th>Menstrual cycle</th>
<th>Menstrual period</th>
<th>Menstrual bleeding quantity (changing period pad frequency)</th>
<th>Nutritional status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;21 days</td>
<td>21-35 days</td>
<td>&gt;35 days</td>
<td>&lt;3 days</td>
</tr>
<tr>
<td>3</td>
<td>42.9</td>
<td>52.0</td>
<td>56.5</td>
<td>0</td>
</tr>
<tr>
<td>65</td>
<td>57.1</td>
<td>48.0</td>
<td>43.5</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
<td>0.253</td>
<td>0.092</td>
<td></td>
<td>0.394</td>
</tr>
</tbody>
</table>

**Overall Discussion**

The result found respondents who had maladaptive in premenstrual coping suffered in PMS (66.2%), while respondents with adaptive in premenstrual coping did not suffered PMS (61.5%). Good premenstrual coping helped adolescence in reduce physical or emotional symptoms during luteal phase of menstrual cycle. Based on Spearman correlation value, there was negative relationship between premenstrual coping and PMS among female midwifery students, r = -0.187. This result showed higher score in premenstrual coping reduced premenstrual syndrome. The premenstrual coping had been used among women with PMS were varies depending on their problem and ability in problem solving. In Turkey, a study among 379 women volunteers found 28.9% preferred listening to music, 33.3% resting and 38.8% crying to overcome depressive mood swings. In additions, study by Tumkur et al. found most respondents had preferred sleeping (63%) and resting (62.3%) in relieve PMS symptom due to fatigue among PMS respondents.

Besides, there was significant premenstrual coping dimension of avoiding harm, awareness and acceptance of premenstrual change and self-care with PMS. Meanwhile, adjusting energy and communicating had no significant relationship with PMS. Avoid harm is defined way how women avoiding situations, people, conversations and thought that lead distress during premenstrual period. The avoiding harm is among effective ways for women to solve problem during premenstrual period which contained social withdrawal such as avoided annoying situation with family and friend by reduced social interaction. Meanwhile, women are tending to accept any premenstrual changes to handle other behaviours. Women with PMS contributed in lack of work productivity, interference with hobbies and missed numerous working days for health reason. The acceptance in stressors also related to severity of premenstrual syndrome. In previous study found self-care had benefits during premenstrual period especially for women with PMDD. The adjusting energy subscale is referred as how women copes by adjusting behaviour to manage physical and emotional condition included emotional outburst, sugary food consumption, lack of exercise and other involvement. The dietary behaviour, emotional dysregulation, environmental, personality and culture also influenced PMS in women.
communicating is a coping method based on finding support and sharing their feeling and need from others. Adolescence who use social support and communication in premenstrual needs lead in premenstrual syndrome improvements.

The result showed nutritional status had correlated with PMS, while age, age of menarche, menstrual cycle, menstrual bleeding duration and menstrual bleeding quantity had no correlated to PMS. The respondents aged 20 years were more experienced PMS (58.3%). The study by Thu et al. found age is correlated with PMS since this symptom are more severe in older women especially aged between 20 years and 35\textsuperscript{18}. The inconsistency result might due to the samples from different background and the relationship between age and PMS is still not fully understood. For age of menarche, respondents with age of menarche aged below than 12 years more likely to have PMS than respondents with age of menarche more than 12 years. The respondents who had menstrual cycle more than 35 days more prone to PMS than respondents had menstrual cycle between 21 days and 35 days and less than 21 days. The menstrual cycle had related to hormone functions such as follicle stimulating hormone (FSH) and Luteinizing hormone (LH) which released from the pituitary gland and sex hormones such as estrogen and progesterone. The study also found respondents who experienced menstrual period between 3 days to 7 days were more suffered PMS than those who had menstrual period more than 7 days. Furthermore, respondents who needed to change period pad more than 5 times per day had suffered PMS than respondents who changed period pads between 3 times and 5 times and less than 3 days per day. Lastly, respondents who were obesity more likely suffered PMS than respondents who were underweight, normal and overweight. Obese women tend to be experienced PMS. Many studies found women with high BMI had risk in PMS than women with low BMI\textsuperscript{9,20,21}. In obese women, estrogen levels is higher than non-obese women. The fat intake had influenced estrogen levels in the bloods. Reed et al. found women with PMDD had high desire in high fat contains food during their luteal phase of menstrual cycle\textsuperscript{12}.

**Conclusion**

In conclusions, there was significant relationship between premenstrual coping with premenstrual syndrome, more adaptive in premenstrual coping and less or decreased in premenstrual syndrome incidence. Besides, there was significant relationship between premenstrual coping dimension of avoiding harm, awareness and acceptance of premenstrual change, and self-care with premenstrual syndrome. Meanwhile, there was no significant relationship between adjusting energy and communicating with premenstrual syndrome. The nutritional status had significant relationship with premenstrual syndrome, while age, age of menarche, menstrual cycle, menstrual bleeding quantity and duration had no significant relationship with premenstrual syndrome.

**Acknowledgement:** The author would like to thank to Kendari Health Polytechnic for resources and data input as well as Faculty of Medicine, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Risk Factors of Obesity among Pregnant Women in Biringkanaya Sub District at Makassar City from 2014 to 2015

Febry Ramadhani Suradji1, H. Andi Zulkifli1, Indra Dwinata1

1Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study is to determine the risk factors of obesity among pregnant women in Biringkaya sub district at Makassar city. The study type was case control study design with pregnant women who had medical record in public health centres (Puskesmas) Sudiang, Sudiang Raya and Paccerakkang in year 2014-2015 as subject. The body mass index (BMI) tool is used in order to measure the index of weight for height as to classify underweight, overweight and obese adults. Total samples were 152 pregnant women with 38 cases and 114 controls. The samples were obtained by using exhaustive sampling technique for case group and purposive sampling techniques for control group. The result found Odds Ratio (OR) of obese pregnant women is influenced by age (OR= 4.632; CI 95% = 2.119- 10.126), parity (OR=3.107; 95% CI = 1.262-7.649), family background (OR=3.4; 95% CI= 1.578-7.527), socioeconomic status (OR=3 .612; 95% CI= 1.189-10.973) and attitude (OR= 0.838; 95% CI = 0.401 – 1.753). In conclusions, pregnant women’s age ≥ 35 years old, parity ≥ 35, family history, high socioeconomic status are risk factors contributing towards obesity among pregnant women.

Keywords: obesity; pregnant women; risk factor; socioeconomic

Introduction

Obesity is major health problem in global since it had impacted on mortality and morbidity in the adult population1. Obesity had contributed to diabetes mellitus (DM), hypertension, high blood cholesterol and cardiovascular diseases2. Furthermore, obesity prevalence is higher in developed countries and increasing in developing countries due to lifestyle changing3. Several factors had contributed in obesity such as genetic, socioeconomic, environment, demographic, lifestyle and culture4,5,6.

Meanwhile, maternal obesity prevalence also increasing and contributed to several complications during pregnancy, birth delivery and post-delivery3. In the United States, half of pregnant women are categorized as obese and 8% are considered as extreme overweight7. The obesity in pregnancy had increased the risk in gestational DM, preterm delivery, spontaneous abortion, postpartum weight retention, congenital anomalies8,9,10.

In Indonesia, obesity prevalence on population aged more than 18 years old is 15.4%, while women had obesity with BMI more than 25 aged 18 years old is 32.9% in 2013. Based on Indonesian National Survey (Riskesdas), South Sulaweswi province was among highest obesity prevalence in Indonesia. In 2013, obesity in women (aged more than 18 years old) was 31.4%.

The maternal age, parity, family history, socioeconomic status and attitudes were related to obesity incidence among pregnant women. Thus, the aim of this study is to determine the risk factors of obesity among pregnant women in Biringkaya sub district at Makassar city.

Methodology

Study Type

The study type was a quantitative research with analytic observational research and case control study design.

Location and Time

This study was conducted from September 2015
to March 2016 at some Puskesmas working area which included Puskesmas Sudiang, Sudiang Raya and Paccerakang in Biringkanaya sub district of Makassar city.

**Population and Sample**

The population for this study were all pregnant women living in Biringkanaya sub district of Makassar city from January 2014 to December 2015. The case sampling used exhaustive sampling technique for case samples and control samples used purposive sampling technique. The sample sizes were 152 pregnant women.

**Data Collection**

The primary data was obtained through questionnaire and secondary data was collected in form of obstetric register data from Puskesmas.

**Data analysis**

The bivariate analysis was performed to determine the relationship of dependent and independent variables. The assessment of risk of each study variable on the obesity pregnant women was done by odd ratio analysis (OR).

**Result and Discussion**

**Bivariate Analysis**

Based on Table 1, the highest proportion of obesity in pregnant women was ≥ 35 years old, 21 respondents (55.3%) and 90 respondents (78.9%) were predominant in non-obesity pregnant women group. The statistical tests OR is 4.632, 95% CI = 2.119-10.126. The risk of obesity in pregnant women aged ≥ 35 years old had 4.632 times greater than mother < 35 years old.

**Table 1. Risk analysis on maternal age of obesity in pregnant women in Biringkanaya sub district at Makassar city 2014-2015**

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Obesity in pregnant women</th>
<th>Total</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>n</td>
</tr>
<tr>
<td>≥ 35 years</td>
<td>21</td>
<td>24</td>
<td>45</td>
</tr>
<tr>
<td>&lt; 35 years</td>
<td>17</td>
<td>90</td>
<td>107</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>114</td>
<td>152</td>
</tr>
</tbody>
</table>

There were 31 respondents (73.5%) had parity more than 2 among obesity in pregnant women and 47 respondents (41.2%) had no parity or one in non-obesity pregnant women as shown in Table 2. The statistical test result found OR = 3.107, CI 95%= 1.262- 7.649. The risk factors in obesity pregnant women were more than 2 with 3.107 times greater than non-obesity pregnant women.

**Table 2. Risk analysis on maternal parity of obesity in pregnant women in Biringkanaya sub district at Makassar city 2014-2015**

<table>
<thead>
<tr>
<th>Parity</th>
<th>Obesity in pregnant women</th>
<th>Total</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>n</td>
</tr>
<tr>
<td>≥ 2</td>
<td>31</td>
<td>67</td>
<td>98</td>
</tr>
<tr>
<td>0-1</td>
<td>7</td>
<td>47</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>114</td>
<td>152</td>
</tr>
</tbody>
</table>
Based on Table 3, 26 respondents with obesity (68.4%) had family history and 70 respondents without obesity (61.4%) had no family history. The statistical test found OR=3.447, 95% CI = 1.578-7.527. The risk factors in obesity pregnant women with family history on obesity are 3.447 times greater than pregnant women without family history on obesity.

Table 3. Risk analysis on family history of obesity in pregnant women in Biringkanaya sub district at Makassar city 2014-2015

<table>
<thead>
<tr>
<th>Family history</th>
<th>Obesity in pregnant women</th>
<th>Total</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>26</td>
<td>44</td>
<td>70</td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>70</td>
<td>82</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>114</td>
<td>152</td>
</tr>
</tbody>
</table>

Meanwhile, 34 respondents with obesity (89.5%) with high socioeconomic status and 80 respondents without obesity (70.2%) with high socioeconomic status as summarized in Table 4. The OR value is 3.612 with 95% CI = 1.189-10.973. The risk factors in obesity pregnant women with high socioeconomic status are 3.612 times greater than non-obesity pregnant women with low socioeconomic status.

Table 4. Risk analysis on maternal socioeconomic status of obesity in pregnant women in Biringkanaya sub district at Makassar city 2014-2015

<table>
<thead>
<tr>
<th>Socioeconomic status</th>
<th>Obesity in pregnant women</th>
<th>Total</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>High</td>
<td>34</td>
<td>80</td>
<td>114</td>
</tr>
<tr>
<td>Low</td>
<td>4</td>
<td>34</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>114</td>
<td>152</td>
</tr>
</tbody>
</table>

Based on Table 5, 21 respondents with obesity (55.3%) had positive attitude and 58 respondents without obesity (50.9%) had positive attitude. Based on statistical test, OR value= 0.838 with 95% CI = 0.401 – 1.753.

Table 5. Risk analysis on attitude of obesity in pregnant women in Biringkanaya sub district at Makassar city 2014-2015

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Obesity in pregnant women</th>
<th>Total</th>
<th>OR ( 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Negative</td>
<td>17</td>
<td>56</td>
<td>73</td>
</tr>
<tr>
<td>Positive</td>
<td>21</td>
<td>58</td>
<td>79</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td>114</td>
<td>152</td>
</tr>
</tbody>
</table>
Overall Discussion

The results found pregnant women aged ≥ 35 years old are more likely to be obese than pregnant women < 35 years old. Age is correlated with obesity. The studies also found high obesity prevalence in women aged of 35 years and above\textsuperscript{2,11}. The body metabolism was reduced with increasing age had lead to difficulty for burning calories and contributed to obesity\textsuperscript{12}.

The high parity also contributed in maternal obesity risk factors. Women who had high parity and age were associated with obesity\textsuperscript{13}. The pregnant women had family history of obesity had risk of 3.4 times greater than pregnant women who did not have family history on obesity. In the United States, a study found mother who is overweight would give birth to obese children\textsuperscript{14}. The obesity prevalence is higher in women than male. Meanwhile, a study suggested married women had 3 times higher risk for obesity than unmarried women\textsuperscript{15}.

In additions, pregnant women with high socioeconomic status are 3.6 times greater than pregnant women with low socioeconomic status on obesity. People with high socioeconomic status affect the purchasing power level which impacted on excessive food intake. In developing countries, obesity prevalence is higher in urban area than rural areas which obesity is common in high socioeconomic society.

Based on this study, it is also found that attitude was not a risk factor for obesity incidence in pregnant women in Biringkanaya sub district of Makassar city. The respondents have knowledge and this influence their daily practice on achieving good nutritional status. Meanwhile, attitude had not been automatically manifested in practice. Hence, attitude is not influenced in obesity incidence among pregnant women.

Conclusion

In conclusions, the pregnant women’s age ≥ 35 years old, parity ≥ 35, family history, high socioeconomic status are risk factors towards obesity among pregnant women. Meanwhile, attitude is not significantly related towards obesity among pregnant women in Biringkanaya sub district at Makassar city.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Risk Factors of Preeclampsia Women in Dr. Wahidin Sudirohusodo Hospital at Makassar City 2015

Fitri Cicilia¹, Muhammad Ikhsan¹, H. M. Tahir Abdullah¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

Preeclampsia or formerly known as toxaemia is a condition of high blood pressure that develops in pregnant woman who have not had high blood pressure before. It usually happens late in pregnancy although it can happen earlier. The aim of this study is to analyse risk factors on maternal age, parity, hypertension history, diabetes mellitus history (DM) toward preeclampsia. The study type was an analytic observational with case control study design. The sample sizes were 80 respondents selected based on simple random sampling. The data was analysed using available SPSS program. The univariate analysis was represented in form of frequency distribution. The bivariate analysis used Odds Ratio (OR) statistic test. The result found that maternal age and parity were not risk factors for preeclampsia with: age variable OR=1.855 95% CI= 0.692-4.973 and parity variable OR= 1.842, 95% CI= 0.755-4.493. Meanwhile, hypertension history and DM history were not calculated since only cases group had hypertension history and DM history.

Keywords: Age; Parity; Preeclampsia; Pregnant Women

Introduction

The preeclampsia and eclampsia contributed to maternal mortality for every 3 minutes in global¹. In the United States, 15% to 17.6% of maternal mortality is caused by preeclampsia². Preeclampsia was diagnosed by increasing in blood pressure (BP) and proteinuria after 20 weeks of pregnancy and ~ 2% to 7% occurred on nulliparous women³.

The preeclampsia was categorized as hypertensive disorder⁴. Chronic hypertension had contributed about 30% of hypertensive disorder cases and 70% cases were caused by preeclampsia⁵ gestational hypertension. Preeclampsia affected body organ and systems which caused by genetic, paternal factors and auto immune⁶. Besides, several factors such as DM, personal or family history with preeclampsia, multiple pregnancy, obesity and chronic hypertension⁷.

Methodology

Study Type

The study type was an analytic observational with case control study design. This study intended to determine the relationship between maternal age, parity, hypertension history and DM history and preeclampsia.

Location and Time

This study was conducted from January to June 2016 at Dr. Wahidin Sudirohusodo Hospital in Makassar city.

Population and Sample

The population for this study were all pregnant women, birth delivery and postpartum in Dr. Wahidin
Sudirohusodo Hospital at Makassar city. The sample sizes were 80 respondents whereby 40 respondents for case group and 40 respondents for control group.

Data Collection and data analysis

The data was obtained from hospital medical record and was analyzed using SPSS program. The univariate analysis was represented in form of frequency distribution, while bivariate analysis was represented to determine relationship between independent and dependent variables.

Result and Discussion

Univariate Analysis

Table 1 tabulated the frequency distribution based on maternal age, parity, hypertension and DM history of the respondents. Based on Table 1, 26 respondents (65.0%) were aged between 20 years and 35 years in the case group and 31 respondents (77.5%) in the control group. Meanwhile, 5 respondents (12.5%) were aged less than 20 years old in the case group and 6 respondents (15.0%) in the control group. Most of respondents were with nulliparous, 21 respondents (52.5%) in case group and 18 respondents (45.0%) in the control group. Meanwhile, 15 respondents (37.5%) with primipara and multipara in the case group and 21 respondents (52.5%) in the control group as shown in the table. There were 30 respondents (75.0%) who had no hypertension history in the case group and 40 respondents (100.0%) in the control group. Besides, there were 10 respondents (25.0%) had hypertension history in the case group. As for DM history, 39 respondents (97.5%) had no DM history in the case group and 40 respondents (100.0%) in the control group. However, only 1 respondent (2.5%) had DM history in the case group.

Table 1. The Frequency Distribution based on Maternal Age, Parity, Hypertension and DM History in Dr. Wahidin Sudirohusodo at Makassar 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Preeclampsia/eclampsia</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>5</td>
<td>12.5</td>
<td>6</td>
</tr>
<tr>
<td>20-35</td>
<td>26</td>
<td>65.0</td>
<td>31</td>
</tr>
<tr>
<td>&gt;35</td>
<td>9</td>
<td>22.5</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nulliparous</td>
<td>21</td>
<td>52.5</td>
<td>18</td>
</tr>
<tr>
<td>Primipara and multipara</td>
<td>15</td>
<td>37.5</td>
<td>21</td>
</tr>
<tr>
<td>Grande multipara</td>
<td>4</td>
<td>10.0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
<tr>
<td>Hypertension history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>25.0</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>75.0</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
<tr>
<td>DM history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>39</td>
<td>97.5</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
</tbody>
</table>
Bivariate Analysis

Table 2 showed risk analysis on maternal age toward preeclampsia in Dr. Wahidin Sudirohusodo at Makassar city. There were 14 respondents (35.0%) with age had risk in the case group and 9 respondents (22.5%) with age had risk in the control group. The OR equal to 1.855 and CI 95% = 0.692- 4.973. There were 25 respondents (62.5%) with parity had risk in the case group and 21 respondents (52.5%) with parity had no risk in the control group as shown in Table 3. Based on statistical test result, OR= 1.842 and 95% CI = 0.755-4.493. Based on Table 4, 30 respondents (75.0%) with hypertension history had no risk in the case group and 40 respondents (100.0%) with hypertension history had no risk in the control group. The statistical test result had zero value since no any samples in the control group. There were 39 respondents (97.5%) had no DM history in the case group and 40 respondents (100.0%) had no DM history in control group. There is no OR and 95% CI for DM history with preeclampsia since control had no sample based on Table 5.

Table 2. Risk Analysis based on Maternal Age in Dr. Wahidin Sudirohusodo at Makassar City 2015

<table>
<thead>
<tr>
<th>Age</th>
<th>Preeclampsia/eclampsia</th>
<th>Total</th>
<th>OR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td>n</td>
</tr>
<tr>
<td>Risk</td>
<td>14</td>
<td>35.0</td>
<td>9</td>
</tr>
<tr>
<td>No risk</td>
<td>26</td>
<td>65.0</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 3. Risk Analysis based on Maternal Parity in Dr. Wahidin Sudirohusodo at Makassar City 2015

<table>
<thead>
<tr>
<th>Parity</th>
<th>Preeclampsia/eclampsia</th>
<th>Total</th>
<th>OR 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td>n</td>
</tr>
<tr>
<td>Risk</td>
<td>25</td>
<td>62.5</td>
<td>19</td>
</tr>
<tr>
<td>No risk</td>
<td>15</td>
<td>37.5</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 4. Risk Analysis based on Hypertension History in Dr. Wahidin Sudirohusodo at Makassar 2015

<table>
<thead>
<tr>
<th>Hypertension history</th>
<th>Preeclampsia/eclampsia</th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>25.0</td>
<td>0</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>75.0</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
<td>40</td>
</tr>
</tbody>
</table>
Table 5. Risk Analysis based on DM History in Dr. Wahidin Sudirohusodo at Makassar 2015

<table>
<thead>
<tr>
<th>DM history</th>
<th>Preeclampsia/eclampsia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>No</td>
<td>39</td>
<td>97.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Overall Discussion

The maternal age of less than 20 years old and more than 35 years old are high risk age group. The reproductive age for pregnancy and childbirth is age between 20 years to 30 years old. Thus, pregnant women aged less than 20 years old and more than 35 years old are at high risk for preeclampsia and eclampsia. The respondents in this study are aged range from 15 years until 42 years old. Based on statistical test result shown OR= 1.855, meant maternal age was not risk factor in preeclampsia. A few studies found no significant relationship between maternal age and preeclampsia\textsuperscript{9,10}. The factor contributing to preeclampsia among pregnant women aged less than 20 years old is due to maternal reaction on initial trophoblastic invasion\textsuperscript{11}. Meanwhile, pregnant women aged more than 35 years old have susceptible with preeclampsia due to chronic hypertension.

Most of pregnant women experienced preeclampsia was commonly in nulliparous mother (parity 0) and multiparous mother (parity 1-3) had low risk in preeclampsia. In this study, maternal parity was not a risk factor for preeclampsia. This study found nulliparous women had 1.842 times risk on preeclampsia same as study done by Opitasari et al. in Jakarta with nulliparous women had 1.8 times of risk in preeclampsia in Jakarta\textsuperscript{12}. Most common complications in grand multipara were preeclampsia, postpartum haemorrhage and foetal distress compared to primipara\textsuperscript{13}.

Hypertension is most common problem during pregnancy and cause of maternal mortality and morbidity. Hypertension in pregnancy is defined by diastolic of 90 mm Hg or greater and systolic of 140 mmHg or greater\textsuperscript{9}. Several studies found hypertension history is correlated to preeclampsia\textsuperscript{14,15}. In this study, OR value was not available since no sample on control group for hypertension history and DM history. Higher BMI during first and last trimester of pregnancy period are correlated to insulin resistance increment at 28 weeks\textsuperscript{3}. In Kendal regency, a study found correlation between DM and pregnancy with preeclampsia at Dr. H. Soewondo Hospital\textsuperscript{16}. In additions, women’s parental history with chronic hypertension also correlated with preeclampsia\textsuperscript{17}. The study by Kobashi et al. found women with parental history of chronic hypertension is at 2.7 times with risk in preeclampsia\textsuperscript{18}.

Conclusion

In conclusions, age and parity were not risk factors for preeclampsia. The hypertension history and DM history has been not calculated since only cases group had hypertension history and DM history.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

2. Anderson NR, Undeberg M, Bastianelli KM.


The Effect of Moringa Oleifera Leaf Biscuit on the Increase of Body Weight and Upper Arm Circumference for Chronic Energy Deficiency among Pregnant Women in Bontoramba District Jeneponto Regency

Fitriani Kasim¹, Saifuddin Sirajuddin¹, Ridwan Amiruddin¹

¹Faculty of Public Health, Hasanuddin University, Jl. PerintisKemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The study aim was an observation on effect of Moringa Oleifera leaf biscuit on increment of body weight, upper arm circumference and nutrition intake on chronic energy deficiency pregnant women in Bontoramba District of Jeneponto Regency. The study was a quasi-experiment pre and post test one group design. The samples were selected using purposive sampling method and involved 34 people for this study. The treatment group was provided Moringa Oleifera leaf biscuit and biscuit from Health Department. The body weight and upper arm circumference were measured before and after the intervention. The data was analysed by using the Wilcoxon test for the upper arm circumference, T-paired test for body weight and nutrient intake used Friedman test with a confident level 95% (p=0.05). The result showed average change of body weight in pregnant women was 7.67 % and upper arm circumference was 1.59 cm. The average change in protein intake was 49.57± 19.77 before intervention, 70.26± 40.63 after 1 month intervention, and 53.56± 20.66 after the intervention (2 months). These variables indicated statistically significant result; p=0.000 for the changes in body weight and upper arm circumference and protein intake with value p=0.037. Thus, Moringa Oleifera leaf biscuit had increased body weight, upper arm circumference and protein intake in chronic energy deficiency pregnant women in Bontoramba district.

Keywords: Body weight; Chronic energy deficiency; Moringa Oleifera leaf biscuit; Protein intake; Upper arm circumference.

Introduction

Malnutrition is public health problem occur in children and pregnant women. In Kenya, high prevalence in malnutrition had observed in pregnant women compared children¹. The malnutrition was in form of under nutrition (wasting, stunting, underweight), micronutrient-related (lack of important vitamin and minerals) and overweight, obesity and diet-related non communicable diseases². A study found that malnutrition had affected one of every five pregnant women studied³. An estimated 200 million pregnant women in developing countries suffered nutrition deficiencies each year⁴.

The sufficient nutrient in pregnant women is important for their health and fetus development. The pregnant women had chronic energy deficiency lead to risk of low birth weight in infants. The low birth infants also are factor associated with neonatal mortality and morbidity and contributed to health problem⁵,⁶. The underweight infants tend to be under-fives with malnutrition status with slower growth and development⁷,⁸. Based on Indonesia Riskesdas(primary health care survey), prevalence risk in pregnant women with chronic energy deficiency aged 15-49 years old, as much as 24.2%⁹. In South Sulawesi, chronic energy deficiency risk prevalence was 32.4%. Overall, prevalence of chronic energy deficiency risk rose in all age group included pregnant and non-pregnant women. In non-pregnant women aged 15-19 years, the prevalence had risen 15.7 percent. Similarly, in pregnant
women aged 45-49 years increased to 15.1%.^{10}

MoringaOleifera was growing in tropical and subtropical region of world.^{11,12} The local people consumed MoringaOleifera as their daily vegetable and potential in therapeutic and dietary supplement to deal with malnutrition.^{13} The MoringaOleifera contained micro-nutrient need by pregnant women such as vitamin C, vitamin A, calcium, potassium, protein, iron, sodium and essential amino acid.^{14,15} The biscuit is utilized from moringa flour became more practical and formulated with other food ingredients commonly use in Supplemental Food Plan (SFP) with reference to standard procedure by the Ministry of Health 2010.

The study aims to observe effect of MoringaOleifera leaf biscuit on the increment of body weight, upper arm circumference and nutritional intake on the pregnant women with chronic energy deficiency in Bontoramba District of Jeneponto regency.

Methodology

This study was a quasi-experiment with pre and post test design. There were two groups in this study: treatment and control group. In pre and post study, the body weight and upper arm circumference measurement was taken for both group. In intervention period, the physical activity and Iron and other multivitamin consumption was observed. This study was conducted in Bontoramba district. The proximate test was done on MoringaOleifera leaf biscuit at Health Laboratory central of Makassar, South Sulawesi. The samples were selected using the purposive sampling method and involved 34 people for this study. The independent variable was MoringaOleifera leaf biscuit and dependent variables were respondent’s body weight and upper arm circumference measurement. The respondent in treatment was given MoringaOleifera leaf biscuit and biscuit from Supplementary Food Program from Health department. The data was analysed by using the Wilcoxon test for the upper arm circumference, T-paired test for the body weight and nutrient intake used the Friedman test with a confident level 95% (p=0.05).

Result and Discussion

Univariate Analysis

Based on Table 1, 6 respondents had pregnant at 2nd trimester and 28 respondents were pregnant at 3rd trimester. Most of respondent, 15 respondents (44.1%) were aged between 19 years and 24 years. There were 3 respondents (8.8%) aged between 13 years and 15 years. Meanwhile, 12 respondents had completed primary school and only 2 respondents had completed diploma. Besides, 32 respondents (94.1%) were unemployed and worked as housewives. There were 33 respondents (97.1%) had undergone pregnancy check up with midwife and only 1 respondent had pregnancy check up with doctor.

Table 1. Distribution of Pregnant Women by pregnancy trimester, age, education level and employment at Bontoramba district in Jeneponto regency

<table>
<thead>
<tr>
<th>Variable</th>
<th>n=34</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy trimester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trimester II</td>
<td>6</td>
<td>17.6</td>
</tr>
<tr>
<td>Trimester III</td>
<td>28</td>
<td>82.4</td>
</tr>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13-15</td>
<td>3</td>
<td>8.8</td>
</tr>
<tr>
<td>16-18</td>
<td>8</td>
<td>23.5</td>
</tr>
<tr>
<td>19-24</td>
<td>15</td>
<td>44.1</td>
</tr>
<tr>
<td>30-49</td>
<td>8</td>
<td>23.5</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not attended school</td>
<td>3</td>
<td>8.8</td>
</tr>
<tr>
<td>Not finished primary school</td>
<td>3</td>
<td>8.8</td>
</tr>
<tr>
<td>Primary school</td>
<td>12</td>
<td>35.3</td>
</tr>
<tr>
<td>Junior High School</td>
<td>10</td>
<td>29.4</td>
</tr>
<tr>
<td>Senior High School</td>
<td>4</td>
<td>11.8</td>
</tr>
<tr>
<td>Diploma</td>
<td>2</td>
<td>5.9</td>
</tr>
<tr>
<td>Employment types</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Housewife</td>
<td>32</td>
<td>94.1</td>
</tr>
<tr>
<td>Other (Midwife)</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>Pregnancy check-up location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwife</td>
<td>33</td>
<td>97.1</td>
</tr>
<tr>
<td>Doctor</td>
<td>1</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: Primary Data, 2015

Bivariate Analysis

Based on Table 2, there were significant different between body weight and the pregnant women’s obedient in MoringaOleifera leaf biscuit consumption. There were difference of 7.7kg between pre and post study for chronic energy deficiency pregnant women that
fully consumed MoringaOleiferaleaf biscuit and only 7.54 kg for respondent that less in MoringaOleiferaleaf biscuit consumption.

Table 3 showed pregnant women’s body weight had increased from 44.98 kg to 52.63 kg with body weight changes of 7.65 (10.9%). The MoringaOleiferaleaf biscuit had influenced the pregnant women’s body weight with (p=0.000<0.05).

The study had observed changes in the upper arm circumference in the pregnant women with chronic energy deficiency before and after intervention for 2 months which shown in Table 4. The upper arm circumference in pregnant women was increased from 21.75 cm to 23.34 cm before and after intervention. Based on Wilcoxon test, there was difference in the upper arm circumference measurement before and after the intervention (p=0.000<0.05).

Table 5 showed comparison of energy and nutrients intake in pregnant women in Bontoramba district. The energy intake between pre intervention (week 0), during the intervention (week 4) and after the intervention (week 8) was showed with p=0.098>0.05. The mean before intervention was 1712 increased to 2320 (week 4) and dropped at 1717 kg after the intervention. There was no statistically significant difference in consumption. The protein intake with p value=0.037<0.05 meant the MoringaOleiferaleaf biscuit consumption had contributed in the protein intake for the pregnant women. The fat intake (p=0.085>0.05) was not significant and not contributed in the nutrition intake for the pregnant women.

### Table 2. Body weight of chronic energy deficiency pregnant women before and after intervention based on compliance level

<table>
<thead>
<tr>
<th>Obedient</th>
<th>Body weight</th>
<th>Post study</th>
<th>Δ Mean</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre study</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD (kg)</td>
<td>Mean ± SD (kg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45.93±4.8</td>
<td>53.70±5.45</td>
<td>7.77</td>
<td>0.000*</td>
</tr>
<tr>
<td>No</td>
<td>44.03±4.3</td>
<td>51.57±4.65</td>
<td>7.54</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

* T paired test

Source: Primary Data, 2015

### Table 3. Body weight changes of pregnant women before and after MoringaOleiferaleaf biscuit and biscuit from Health department

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Body weight</th>
<th>Body Weight</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Mean± SD</td>
<td>Post Mean± SD</td>
<td>Δ Mean</td>
</tr>
<tr>
<td>Moringa leaf biscuit + biscuit from Health Department</td>
<td>44.98± 4.5</td>
<td>52.63± 5.10</td>
<td>7.65 (10.9%)</td>
</tr>
</tbody>
</table>

* T paired test

Source: Primary Data, 2015
Table 4. Upper arm circumference changes in the pregnant women before and after Moringa Oleifera leaf biscuit and biscuit from Health department consumption

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Body weight</th>
<th>Body Weight</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Mean ± SD</td>
<td>Post Mean ± SD</td>
<td>Δ Mean</td>
</tr>
<tr>
<td>Moringa leaf biscuit + biscuit from Health Department</td>
<td>21.75 ± 1.13</td>
<td>23.34 ± 1.59</td>
<td>1.59 (17.00%)</td>
</tr>
</tbody>
</table>

* Wilcoxon test

Source: Primary Data, 2015

Table 5. Comparison of nutrient intake in the pregnant women with chronic energy deficiency before and after intervention in Bontoramba District

<table>
<thead>
<tr>
<th>Intake</th>
<th>Week 0</th>
<th>Week 4</th>
<th>Week 8</th>
<th>p value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Moringa leaf biscuit + biscuit</td>
<td>Moringa leaf biscuit + biscuit</td>
<td>Moringa leaf biscuit + biscuit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>from Health Department (n=34)</td>
<td>from Health Department (n=34)</td>
<td>from Health Department (n=34)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td>1712 ± 7.03</td>
<td>2320 ± 1.62</td>
<td>1717 ± 5.76</td>
<td>0.098</td>
</tr>
<tr>
<td>Protein</td>
<td>49.57 ± 19.77</td>
<td>70.26 ± 40.63</td>
<td>53.56 ± 20.66</td>
<td>0.037</td>
</tr>
<tr>
<td>Fat</td>
<td>30.63 ± 18.21</td>
<td>48.12 ± 31.73</td>
<td>42.19 ± 22.12</td>
<td>0.085</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>306.78 ± 1.35</td>
<td>385.04 ± 3.46</td>
<td>279.18 ± 92.94</td>
<td>0.439</td>
</tr>
<tr>
<td>Fibre</td>
<td>10.03 ± 4.24</td>
<td>21.07 ± 55.01</td>
<td>12.18 ± 7.73</td>
<td>0.237</td>
</tr>
<tr>
<td>Iron</td>
<td>10.56 ± 12.52</td>
<td>8.35 ± 5.79</td>
<td>7.67 ± 3.55</td>
<td>0.868</td>
</tr>
</tbody>
</table>

+* Friedman test

Source: Primary data, 2015

Overall Discussion

The Moringa Oleifera leaf biscuit is tested for protein content used semi-micro Kjehdal method based on Health laboratory of Makassar Standard of Operation (SOP). The screening process is done in twelve villages in Bontoramba district for six weeks and 61 pregnant women suffered chronic energy deficiency. However, only 38 pregnant women were willing to be subjects for this study. The respondent in treatment group is given 56 Moringa Oleifera leaf biscuit per week and consumed as many as eight pieces per day. During intervention period, the author would have visited respondent’s house for given biscuit and hearing the feedback. In 5th week, food frequency questionnaire (FFQ) was conducted to understand food consumption types in past month. In 8th week intervention, body weight and upper arm circumference and FFQ measurement were carried out.

In the study, chronic energy deficiency pregnant women had attended only primary school and lack of knowledge in pregnancy. The respondent had difficulty to consume Moringa Oleifera leaf biscuit since this biscuit had distinctive flavour. The pregnant women completed minimum education were generally more aware compared pregnant women had no education in nutritional status improvement. The education level had significant influence on nutritional status among pregnant women in India.
The study found Moringa Oleifera leaf biscuit consumption among chronic energy deficiency pregnant women for 2 months increased body weight and upper arm circumference. The study also found 17 respondents had increment in upper arm circumference to normal measurement (upper arm circumference ≥ 23.5 cm). Moringa Oleifera leaf biscuit had statistically increased upper arm circumference (p = 0.000) with an average increased from 21.75 to 23.34 cm. Many assumptions suggested body weight of pregnant women increased due to growth of fetus even though no additional food consumed by pregnant women. The pregnant women had consumed Moringa Oleifera leaf biscuit had experienced in body weight gain of 7.77 kg whereas pregnant women less consumed Moringa Oleifera leaf biscuit only gain 7.54 kg in body weight. The body weight gain had met body weight gain criteria that proposed by Directorate of Community Nutrition (2010) stated chronic energy deficiency pregnant women had gain body weight ranged between 4.5 and 6.5 for 2nd trimester and 3rd trimester for 6.5 kg to 9.5 kg. The nutritional status in pregnant women had affected the infant birth weight. The studies suggested chronic energy deficiency in pregnant women was related with low birth weight18, 19.

Moringa Oleifera leaf biscuit consumption is acted as alternative food since this biscuit had provided additional energy of 264.7 Kcal and met daily protein intake. In addition, this biscuit also increased appetite among chronic energy deficiency pregnant. The nutrition contribution of Moringa Oleifera leaf biscuit included energy, fat, carbohydrate, fibre and iron was not statistically significant different before and after intervention. Lack of energy and proteins among pregnant women especially iron and folic acid lead to pregnant women suffered anemia18. Besides, Moringa Oleifera leaf also helped in DNA damage prevention in pregnant women since Moringa Oleifera leaf had high antioxidant activity20. Meanwhile, Moringa Oleifera leaf had increased haemoglobin level and no low birth weight in pregnant women21. A study had suggested pregnant women consumed Moringa Oleifera leaf and flower had increased milk for infant22. The study was indicated that statistically Moringa Oleifera leaf biscuit had increased the body weight, upper arm circumference and protein intake before and after the intervention in chronic energy deficiency pregnant women in Bontoramba Jeneponto District.

Conclusion

In conclusion, Moringa Oleifera leaf biscuit affected increment in body weight and upper arm circumference in chronic energy deficiency pregnant women at Bontoramba Jeneponto District. Besides, Moringa Oleifera leaf biscuit also affect nutrition intake especially protein in pregnant women. Moringa Oleifera leaf biscuit maintained as additional food in supplemental food plan program. The upper arm circumference increased due to amino acid in Moringa Oleifera plant and as a source of potential nutrients. In additions, Moringa Oleifera leaf biscuit had suggested to children that had malnutrition problem.

Acknowledgment: The author would like to thank to all participants and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

6. Tripathy P. Clinical characteristic & Morbidity


Analysis of Effectiveness in Addition of Coffee and Brown Sugar on Wastewater Treatment in Regional Public Service Agency (BLUD) Haji Padjonga DG Ngalle Hospital at Takalar Regency

Fitriany¹, Anwar Mallongi¹, Syamsuar Manyullei¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

A process of changing wastewater into usable water that can be released into the environment is called as wastewater treatment. Generally, wastewater contains a lot of contaminations such as toxins, chemicals and bacteria. Treatment is important in order to make sure the overall contaminations are reduced to the acceptable specification. The aim of this study is to determine effectiveness in addition of coffee and brown sugar to wastewater treatment in Regional Public Service Agency (BLUD) Haji Padjonga Dg Ngalle Hospital at Takalar regency. The study type was quasi-experimental study using pre and post-test design. The results found that addition of coffee and brown sugar to the wastewater treatment in BLUD Haji Padjonga Dg Ngalle at Takalar is effective based on regulation of Ministry of Environment and Forestry Republic Indonesia no.5 year 2014 in which BOD level is less than 50 mg/l with decrement efficiency of 86.34% (366.03 mg/l dropped to 50 mg/l), COD level less than 80 mg/l with decrement efficiency of 86.76% (600 mg/l reduced to 79.45 mg/l) and TSS level less than 30 mg/l with decrement efficiency of 79.73% (136 mg/l decreased to 27.56 mg/l).

Keywords: brown sugar; coffee; Takalar regency; wastewater treatment.

Introduction

The wastewater composition is defined as substantial quantity of chemical, physical and biological elements present in wastewater¹. The wastewater from domestic, industrial, agriculture and commercial were the ones which harmed human life². World Bank, Food and Agriculture Organization (FAO) and World Health Organization (WHO) had estimated an average annual in reused water volume can raised up to 25 in several countries included the United States, Japan, Spain, Israel, China and Australia¹. Besides, 70% of wastewater generated in developed countries, 38% in developing countries and 28% in undeveloped and only 8% of water is treated⁴.

In general, hospital had produced higher wastewater than household (400-1200 l/bed.d versus 100 l/capita.d)¹. The waste from hospital contained pathogenic microorganisms, pharmaceutical partially metabolized, toxic chemical substances, drugs and radioactive elements¹,⁶. The chemical substances such as anti-tumour agents, antibiotic and organohalogen compounds which left in wastewater treatment plants had contributed to environment pollution⁷. In many countries, hospital wastewater had been treated together with domestic wastewater and released to receiving environment without specific pre-treatment⁸.

Haji Padjonga Dg Ngalle Hospital is a government hospital in Takalar regency. Based on the observation, Haji Padjonga Dg Ngalle Hospital has wastewater treatment plant with biological system by using anaerobic bacteria in wastewater degradation. The bacteria had been cultivated in aero reactor room by giving additional nutrients such as coffee and brown sugar into the bio reactor. The coffee and brown sugar is main source of carbohydrates for microorganisms in degrading wastewater. Several studies have been done on effectiveness of coffee and brown sugar in wastewater treatment.
treatment in few industries\textsuperscript{9,10,11}. The objective for this study is to determine the effectiveness in addition of coffee and brown sugar on wastewater treatment in BLUD Haji Padjonga Dg Ngalle Hospital at Takalar regency.

**Methodology**

**Study Type**

This study used quasi experiment method with pre and post-test design.

**Location and Time**

This study was conducted in October 2016 at BLUD haji Padjonga Dg Ngalle Takalar regency.

**Population and Sample**

The population in this study is wastewater in BLUD Haji Padjodnga Dg Ngalle at Takalar regency. The samples for this study were wastewater portion during pre and post-test.

**Data Collection and Data Analysis**

The primary data was obtained by determining biochemical oxygen demand (BOD), chemical oxygen demand (COD), total suspended solid (TSS) and pH of wastewater pre and post-test with addition of coffee and brown sugar in the wastewater. The effectiveness in addition of coffee and brown sugar was obtained by comparison BOD, COD and TSS levels and Regulation of Minister of Environment No. 5 of 2014.

**Result and Discussion**

**Results**

Based on Table 1, the temperature in the wastewater bio-reactor is ranged between 26 °C to 27 °C, while pH value of this wastewater is within the range of 6.8 to 7.2. BOD observed had decreased during pre and post-test. On the first day, no addition of coffee and brown sugar has led BOD to not meet the quality standard. Besides, BOD is reduced in second day from 114.54 mg/l to 37.35 mg/l with decrement efficiency of 67.39%. BOD content had decreased from 366.03 mg/l to 50 mg/l with decrement efficiency of 86.34%. These results had met government quality standard, Regulation of Minister of Environment Republic Indonesia No.5 year 2014 which is less than 50 mg/l but still not fulfilled Governor Regulation SULSEL Number 69 year 2010 which is <30 mg/l. Figure 1 shows the decrement efficiency of BOD level of wastewater from day 1 to day 3.

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Temperature (°C)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12 October 2016</td>
<td>27</td>
<td>7.2</td>
</tr>
<tr>
<td>2</td>
<td>13 October 2016</td>
<td>26</td>
<td>6.8</td>
</tr>
<tr>
<td>3</td>
<td>14 October 2016</td>
<td>26</td>
<td>7.0</td>
</tr>
</tbody>
</table>

**Table 1. Data condition for wastewater temperature and pH of bio reactor in BLUD Haji Padjonga Dg Ngalle 2016**

<table>
<thead>
<tr>
<th>Day</th>
<th>BOD in pre-test (mg/l)</th>
<th>BOD in post-test (mg/l)</th>
<th>Decrement</th>
<th>Decrement efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>236.55</td>
<td>129.48</td>
<td>107.07</td>
<td>45.26</td>
</tr>
<tr>
<td>2</td>
<td>114.54</td>
<td>37.35</td>
<td>77.19</td>
<td>67.39</td>
</tr>
<tr>
<td>3</td>
<td>366.03</td>
<td>50</td>
<td>316.03</td>
<td>86.34</td>
</tr>
</tbody>
</table>

**Table 2. BOD content of wastewater pre and post-test with addition of coffee and brown sugar (500mg) 2016**
There is no addition of coffee and brown sugar since COD content did not meet the quality standard on the first day. The COD content had reduced from 450 mg/l to 77.02 mg/l with decrement efficiency of 78.04%. In additions, COD content was reduced from 600 mg/l to 79.45 mg/l with decrement efficiency of 86.76%. These result met government quality standard, Regulation by Minister of Environment and Forestry Republic Indonesia no.5 year 2014 which is less than 80 mg/l but still not met standard South Sulawesi governor, Regulation no.69 year 2010 which less than 70 mg/l. Figure 2 shows the decrement efficiency of COD level of wastewater from day 1 to day 3.

<table>
<thead>
<tr>
<th>Day</th>
<th>COD in pre test (mg/l)</th>
<th>COD in post test (mg/l)</th>
<th>Decrement</th>
<th>Decrement efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400</td>
<td>87.82</td>
<td>312.18</td>
<td>78.04</td>
</tr>
<tr>
<td>2</td>
<td>450</td>
<td>77.02</td>
<td>372.98</td>
<td>82.88</td>
</tr>
<tr>
<td>3</td>
<td>600</td>
<td>79.45</td>
<td>520.55</td>
<td>86.76</td>
</tr>
</tbody>
</table>

Figure 2. Decrement efficiency of COD level of wastewater in BLUD Haji Padjonga Dg Ngalle
Based on Table 4, there was a decrement of TSS from 109 mg/l to 42 mg/l with decrement efficiency of 61.46% on second day. Meanwhile, TSS content reduced from 136 mg/l to 27.56 mg/l with decrement efficiency of 79.73% on third day. These results did not meet the quality standard for both government and governor regulation which is less than 30 mg/l.

The optimal temperature for treatment ranged between 15 °C to 40 °C. High temperature had prevented enzyme activity in the cell and decreased efficiency. The wastewater temperature ranged 26 °C to 27 °C indicated to be suitable for microorganism growth. However, the temperature in bio rector is still below quality standard of wastewater based on Regulation of Ministry Environment and Forestry of Republic Indonesia no.5 year 2014 which is 38 °C and South Sulawesi Governor Regulation no.69 year 2010 which is 30 °C. The acidic wastewater caused toxins which harm to the environment. The good pH is ranged between 6.5 and 8.5. In this study, wastewater pH value was ranged at 6.8 to 7.2. These pH values are still below quality standard of wastewater based on Regulation of Ministry Environment and Forestry of Republic Indonesia no.5 year 2014 which is between 6 and 9 and South Sulawesi Governor Regulation no.69 year 2010 which is between 6 and 9. Figure 3 shows the decrement efficiency of BOD level of wastewater from day 1 to day 3.

Table 4. TSS content of wastewater pre and post-test with addition of coffee and brown sugar (500mg) 2016

<table>
<thead>
<tr>
<th>Day</th>
<th>TSS in pre-test (mg/l)</th>
<th>TSS in post-test (mg/l)</th>
<th>Decrement</th>
<th>Decrement efficiency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>59</td>
<td>46</td>
<td>43.81</td>
</tr>
<tr>
<td>2</td>
<td>109</td>
<td>42</td>
<td>67</td>
<td>61.46</td>
</tr>
<tr>
<td>3</td>
<td>136</td>
<td>27.56</td>
<td>108.44</td>
<td>79.73</td>
</tr>
</tbody>
</table>

Figure 3. Decrement efficiency of TSS level of wastewater in BLUD Haji Padjonga Dg Ngalle

The study showed BOD, COD and TSS levels were decreased during pre and post-test. High BOD content led to less dissolved oxygen since oxygen in water had been consumed by microorganism. The organic composition which is produced by hospital wastewater and high oxygen had led to high BOD levels in first day. Addition of coffee and brown sugar had decreased BOD levels in post study. The result indicated that addition of coffee and brown sugar had accelerated microorganism growth.

Meanwhile, COD level is oxygen demand level in wastewater. COD measurement is more accurate than BOD measurement. In a study by Setyawan\textsuperscript{12}, bio natural system had decreased COD content in anaerobic wastewater treatment up to 60%-70%.\textsuperscript{12} TSS is suspended solid which could be organic and inorganic. The suspended solid had reduced sunlight penetration into the water, thus affecting oxygen regeneration and photosynthesis. A study found that decreased in TSS, BOD and total phosphorus had increased efficiency...
of sewage treatment plant in reduction of organic and nutrient loads from sewage water at downstream Sambul river in Kenya. 

### Conclusion

In conclusions, addition of coffee and brown sugar to the wastewater treatment in BLUD Haji Padjonga Dg Ngalle at Takalar is effective based on regulation of Ministry of Environment and Forestry Republic Indonesia no.5 year 2014 in which BOD level is less than 50 mg/l with decrement efficiency of 86.34% (366.03 mg/l dropped to 50 mg/l), COD level is less than 80 mg/l with decrement efficiency of 86.76% (600 mg/l reduced to 79.45 mg/l) and TSS level is less than 30 mg/l with decrement efficiency of 79.73% (136 mg/l decreased to 27.56 mg/l).

### Acknowledgement:
The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

### Ethical Clearance:
Taken from the committee

### Source of Funding:
Nil

### Conflict of Interest:
 Nil

### References
3. Angelakis AN, Snyder SA. Wastewater treatment and reuse: Past, present, and future.
9. Baryatik P. Utilization of coffee pulp active charcoal as a chromium (Cr) metal adsorbent in batik liquid waste (Case Study of UD. Pakem Sari Batik Industry Sumberpakem Village Sumberjambe District, Jember Regency).
The Analysis of Health Risk Resulted from the Consumption of Tomatoes (Cytopersicon esculentum) and Chili (Capsicum Annuum L.) which contain Profenofos Residues at the Vendor Daya Market, Biringkananaya sub district

Ganda Kusuma Jaya¹, Anwar¹, M. Alimin Maidin¹

¹Faculty of Public Health, Hasanuddin University. Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study to analyze health risk caused by consumed pesticide residues on chilli and tomato in market sellers Biringkanaya Southwestern District of Makassar city. The study was used observational approach to analyze environment health risks. The number of respondent for this study was 53 people who consumed the tomatoes and chilies contained residue profenofos. The data were analyzed with environment health risk analysis method and processed using excel and IBM SPSS program. The profenofos concentration measurement result showed two samples concentrations below 1 mg/kg. The highest profenofos residual concentration in tomatoes is 0.4234 mg/kg and 1 tomato samples was not detected. The highest profenofos residue in chillies was 2.722mg/kg and lowest concentration was 2.521 mg/kg. The mean of Target Hazard Quotient (THQ) real time and life time among respondents who consumed profenofos residues on chilli and tomato <1. This means there is no risk to health. The mean of Hazard Index (HI) real time and life time among respondents who consumed profenofos residues on chilli and tomato <1, which means there is no risk to health. The mean of Risk Quotient (RQ) real time and life time among respondents who consumed profenofos residue in tomato and chilli real time <1, which means there is no risk to health. The mean RQ in tomato life time> 1, which means health risk if consumed.

Keywords: Analysis of environment health risk; Chili; Profenofos; Tomato

Introduction

The pesticide residues are chemical substances contained in the agricultural products, food or animal foods. The residue in plant comes from spraying on the plants. The insecticidal residues are present in all plant bodies such as stems, leaves, fruits and roots. The pesticide residue is still present in fruit and vegetable even though these fruit and vegetable was washed or cooked¹. The pesticide residues had an indirect effect on the customer and caused the health problem on long-term consumption such as neurological disorder and enzyme metabolism. The pesticide residue in the food was accumulated in the body tissues and leads to impair liver, kidney, nervous system, immunity system, birth defect, allergies and cancer².

The profenofos is one type of organophosphate insecticide with maximum limit of residue in accorded with Indonesian National Standard which is 5 mg/ kg in the red chilies. The profenofos is used to kill pest in tomato and red chili plants. The maximum residue limit (MRL) is allowed is 0.05ppm in vegetables; 0.10 ppm in water and 0.005 ppm on the soil³. Based on Ministry of Agriculture regulation, the pesticide was allowed in red chillies were carbendazim, profenofos and quinoxifen. Curcron was one of pesticide product that controlled pest on chili had active ingredient of profenofos⁴.

The proponofos is one type of organophosphate contamination is found in red chili, lettuce and onion at Bandungan and Brebes⁵. Based on the study conducted by the Agricultural Research and Development Agency showed unwashed tomatoes contained profenofos average 0.096 mg/kg, while the washed tomatoes contained 0.059 mg/
The organophosphorus pesticides were most toxic pesticides compared to other types of pesticide because it attacked the nervous system. The pesticide was lead negative impact toward environment and human health. The profenofos is impact biodiversity ecosystems and caused biological population unbalanced.

A study showed 13 respondents had severe poisoning and 37 respondents had mild poisoning among 50 respondents worked as farmers in Bandungan district. In Malaysia, the pesticide residue was highest found in tomato (30%) and lowest was found in capsicum (4.5%). Meanwhile, pesticide residues (Diazinon and Quinalphos) was detected in long yard bean was 66.7% that over limit Acceptable Daily Intake (ADI), (Quinalphos, 0.002 mg/kg body weight and Diazinon, 0.004 mg/kg body weight).

Daya market is located in Biringkanaya sub-district, Makassar city which was central for tomatoes and chilies sale. The author would like to study profenofos residue exposure to the sellers and buyers of tomatoes and chilies in the market. There was potentially at risk for pesticide exposure in Daya market with certain doses and exposure duration to the pesticide caused both acute and chronic disease. Based on these problems, the author had conducted a study on people who consumed tomatoes (lycopersiconesculentum) and chilies (Capsicum annum L.) contained profenofos residue in Daya market at Biringkanaya sub-district, Makassar city.

**Methodology**

The study was used observational method with Environmental Health Risk Analysis Design which observed on the samples to understand the studied variables namely Organophosphate pesticide active substances profenofos in Daya market. The sample results had analyzed used formula to determine health risk. This study was conducted at Daya market in Biringkanaya sub-district, Makassar city, South Sulawesi Province. This study was conducted within 3 months from March 2016 until May 2016. The population for this study was vegetable sellers in Daya market, Biringkanaya sub district, Makassar city, South Sulawesi Province. The samples were selected based on purposive sampling method. The numbers of respondents selected for this study were 53 people who consumed tomatoes and chilies contained profenofos residue. The tomatoes and chilies were obtained from Daya market that wrap with aluminum foil and plastic. The sample criteria for this study are consumer and the sellers in Daya market, Biringkanaya sub-district, Makassar regency, South Sulawesi province.

The primary data was obtained from observation through measurement such as profenofos residue concentration on tomatoes and chilies. Meanwhile, secondary data was obtained from Biringkanaya district office, Makassar health office for health data, and vegetables and pesticides data had obtained from Makassar agriculture department and South Sulawesi department of Agriculture Food Crops and Horticulture. The questionnaires data were obtained from interview with respondents who consumed tomatoes and chilies contained profenofos residues. This data used to calculate profenofos residue in tomatoes and chilies that consumed by the respondent. The data were analysed with environment health risk analysis method and processed using excel and IBM SPSS program. The data analysis method used was Environment Health Risk Analysis method to determine hazard identification and exposure analysis. The risk analysis was calculated intake for daily and weekly to determine health risk. This study used formula estimated weekly intake (EWI) and target hazard quotient (THQ). The EWI calculation was proposed to understand average tomatoes and chilies consumption calculated for a week. Meanwhile, THQ calculation was dangerous potential occurred in the respondent that consumed contamination tomatoes and chilies.

**Result and Discussion**

**Result**

From Table 1, the profenofos concentration in tomato sample I was undetected. Meanwhile, tomato sample II contained 0.4234 mg/ kg. The chilies contained high profenofos concentration, chilies sample III contained 2.521 mg/kg and chilies sample IV contained 2.722 mg/kg.
Table 1. Profenofos residues in the tomato and chili were consumed by Biringkanaya Camatan’s resident in 2016.

<table>
<thead>
<tr>
<th>No</th>
<th>Sample</th>
<th>Profenofos concentration (mg/kg)</th>
<th>The location sample taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tomato sample I</td>
<td>No detection</td>
<td>PasarDaya (North)</td>
</tr>
<tr>
<td>2</td>
<td>Tomato sample II</td>
<td>0.4234</td>
<td>PasarDaya (South)</td>
</tr>
<tr>
<td>3</td>
<td>Chili sample III</td>
<td>2.521</td>
<td>PasarDaya (Main Entrance)</td>
</tr>
<tr>
<td>4</td>
<td>Chili sample IV</td>
<td>2.722</td>
<td>PasarDaya (Middle)</td>
</tr>
<tr>
<td></td>
<td>Average chili samples</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Primary data

Table 2 showed THQ mean based on real time for chilies consumption was 0.00085, median was 0.00069, standard deviation was 0.00067 and minimum was 0.00016. THQ real time for the tomatoes mean was 0.000138, median was 0.000112, and standard deviation was 0.000108. Meanwhile, THQ of 30 years real time mean, median and standard deviation for chilies were 0.001505, 0.001571 and 0.000712. The minimum and maximum based on 30 years life time for chilies were 0.000311 and 0.003431. Even though, increment in tomatoes for mean, median, standard deviation based on 30 years life time: 0.000568, 0.000511 and 0.000318.

Table 2. THQ for the respondents that consumed tomatoes and chilies that contained profenofos residue at Biringkanaya sub-district in 2016

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Real Time</th>
<th>Tomato</th>
<th>30 years life time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chili</td>
<td>Tomato</td>
<td>Chili</td>
</tr>
<tr>
<td>Mean</td>
<td>0.00085</td>
<td>0.000138</td>
<td>0.001505</td>
</tr>
<tr>
<td>Median</td>
<td>0.00069</td>
<td>0.000112</td>
<td>0.001571</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.00067</td>
<td>0.000108</td>
<td>0.000712</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00016</td>
<td>0.000026</td>
<td>0.000078</td>
</tr>
<tr>
<td></td>
<td>0.000311</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>0.00340</td>
<td>0.000549</td>
<td>0.003431</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.00066</td>
<td>0.000108</td>
<td>0.001309</td>
</tr>
<tr>
<td></td>
<td>0.00103</td>
<td>0.000167</td>
<td>0.001701</td>
</tr>
<tr>
<td>Significant</td>
<td>0</td>
<td>0.200</td>
<td>0.073</td>
</tr>
</tbody>
</table>

Source: Primary Data

Based on hazard index (HI) in Table 3, respondent’s real time mean, median and standard deviation were 0.00990, 0.000806 and 0.000774. The minimum and maximum of real time were 0.000187 and 0.003946 for respondent. Meanwhile, hazard index mean, median and standard deviation based on 30 years life time were 0.002074, 0.002235 and 0.000943. The minimum and maximum based 30 years life time was 0.000460 and 0.004820.
Table 3. Hazard Index (HI) for the respondent that consumed tomatoes and chilies that contained the profenofos residue at Biringkanaya sub-district in 2016

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Hazard Index (HI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Realtime</td>
</tr>
<tr>
<td>Mean</td>
<td>0.000990</td>
</tr>
<tr>
<td>Median</td>
<td>0.000806</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.000774</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.000187</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.003946</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.000777 0.001204</td>
</tr>
<tr>
<td>Significant</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Primary Data

Based on Table 4, profenofos residues intake on chilies real time mean, median and standard deviation were 0.000037, 0.000031, and 0.00027. The minimum and maximum for chilies intake were 0.000006 and 0.000140. Meanwhile, tomatoes real time intake mean, median and standard deviation were 0.000014, 0.000011 and 0.000011. The minimum and maximum of tomatoes real time intake were 0.000003 and 0.000055. The chilies intake mean, median and standard deviation for 30 years life time were 0.000151, 0.000157 and 0.000071. The minimum and maximum of chilies intake based on 30 years life time were 0.000031 and 0.000343. The tomatoes intake mean, median and standard deviation were 0.000057, 0.000051 and 0.000032 based on 30 years life time. The minimum and maximum of tomatoes intake based on 30 years life time were 0.000008 and 0.000145. The interval estimation was between 0.000048 and 0.000145.

Table 4. Risk Quotient (RQ) exposure of tomatoes and chilies consumption that contained profenofos residues in Biringkanaya sub-district in 2016

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Real Time</th>
<th>30 years life time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chili</td>
<td>Tomato</td>
</tr>
<tr>
<td>Mean</td>
<td>0.369540</td>
<td>0.138362</td>
</tr>
<tr>
<td>Median</td>
<td>0.314221</td>
<td>0.112133</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.272671</td>
<td>0.107811</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.056760</td>
<td>0.025970</td>
</tr>
<tr>
<td>Maximum</td>
<td>1.396540</td>
<td>0.548649</td>
</tr>
<tr>
<td>Variance</td>
<td>0.074</td>
<td>0.012</td>
</tr>
<tr>
<td>95% CI</td>
<td>0.294382</td>
<td>0.108645</td>
</tr>
<tr>
<td></td>
<td>0.444697</td>
<td>0.168078</td>
</tr>
<tr>
<td>Significant</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Source: Primary Data

Based on Table 5, RQ cumulative of chilies and tomatoes real time exposure mean was 0.507901, median was 0.396354 and standard deviation was 0.362303. The minimum and maximum of RQ cumulative real time were 0.084256 and 1.847648. The interval estimation of RQ cumulative for tomatoes and chilies was between 0.408038 and 0.607764. RQ cumulative lifetime mean was 2.076492, median was 2.234927 and standard deviation was 0.945098. For RQ cumulative mean based on 30 years life time was 2.076492, median was 2.234927, and standard deviation was 0.9445098. The minimum and maximum of RQ cumulative based on 30 years lifetime were 0.462028 and 4.816652. The interval estimation based on 30 years lifetime was between 1.815991 and 2.336993.
Table 5. Risk Quotient (RQ) exposure of chilies and tomatoes consumed contained profenofos residues in Biringkanaya sub district 2016

<table>
<thead>
<tr>
<th>Cumulative RQ</th>
<th>Cumulative RQ life time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Real time</td>
</tr>
<tr>
<td></td>
<td>≤ 1</td>
</tr>
<tr>
<td>n</td>
<td>48</td>
</tr>
<tr>
<td>%</td>
<td>90.6</td>
</tr>
</tbody>
</table>

Source: Primary Data, 2016

Conclusion

The profenofos residue concentration in tomatoes was 0.4234 mg/kg and average was 0.26215 mg/ kg. Based on these results, concentration of profenofos residue in tomatoes was still below the MRLs that specified by SNI in 2009 that was 2.0. The study showed profenofos residue concentration had passed standard of RFD US-EPA in 2006 that was 0.0001 mg/ kg/ day. In contrast, the profenofos concentration in chilies was exceeded the specified standard. The average target of real time for tomatoes was 0.000138 and average real time for chilies was 0.00085. The 30 years life time for tomatoes was 0.000568 and chilies were 0.0001505. There was no risk in non-carcinogenic disease because of profenofos residue exposure due to THQ<1. Meanwhile, average total real time for HI was 0.000990 and 30 years life time was 0.002074. There was no any non-carcinogenic risk due to HI<1. The average real-time risk for chilies was 0.369540 and tomatoes was 0.571353. The risk of life time for chilies showed non-carcinogenic health risk due to profenofos residue exposure (RQ>1). The average total risk (RQ cumulative) real time for chili and tomato was 0.507901 and life time was 2.076492. It had showed health risk of non-carcinogenic affected at life time because RQ<1. The limitation of chili and tomato consumption needed reduced to avoid profenofos residue and other active substances on health. The chilies and tomatoes needed to be wash well before cooking. Besides, the farmer needed to enrich their knowledge about their high quality of chilies and tomatoes production without using the pesticides.

Acknowledgment: The author would like to thank to all participants and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Correlation between the Level of Von Willebrand Factor (VWF) and Blood Pressure of Pregnant Women in Makassar City

Hardianti1, Abdul Razak Thaha1, Burhanuddin Bahar1

1Faculty of Public Health, Hasanuddin University, Jl. PerintisKemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this study to analyses the correlation between the Von Willebrand factor (VWF) and blood pressure of pregnant women in Makassar. The study was used cross sectional study which is conducted in community health center (Puskesmas) of Makassar city from August to November 2015. The subjects were primigravida pregnant women ranged from 17 to 35 years old and had no history background on chronic hypertension. The data collections were the sample characteristics, anthropocentric data and blood pressure data. The blood sample was examined at Nechri Laboratory of Hasanuddin University. The data were analyzed used Chi-square by SPSS programmed to analyze the correlation between the level of Von Willebrand Factor(VWF) and systolic and diastolic blood pressure. The study was indicted that the average systolic and diastolic blood pressure of the samples was respectively 101.08 mmHg and 70.81 mmHg. The mean level VWF of the samples was 363.41 ng/ml. There was no significant correlation between VWF level and systolic (p=0.09) and diastolic (p=0.643) blood pressure.

Keywords: Blood pressure; Pregnant women; VWF

Introduction

Hypertension during pregnancy contributed to maternal morbidity and mortality around the world. The hypertension is affected 20%-30% of adult population and more than 5%-8% of pregnant women. The hypertension in pregnant women increased the risk for pregnancy complications such as cerebral hemorrhage, intravascular coagulation (DIC), liver dysfunction and acute renal failure. In United States, an estimated of 15% of maternal mortality was due to hypertension.

The hypertension occurs in forms of preeclampsia or known as gestational hypertension. The hypertension was clinical diagnosis as systolic blood pressure ≥140 mm Hg and/or diastolic ≥ 90 mm Hg. The maternal age and obesity and ethnic profile changed were among risk factors that leads hypertension.

The Von Willebrand factor (VWF) is an acute-phase protein and a market of endothelial damage. The VWF deficiency was related with bleeding tendency that increased evidence thrombogenesis. In a study, number of active in VWF was observed related with acute endothelial cell activation and decreased ADAMTS13 activity.

The study was conducted on pregnant women to analyze correlation between Von Willebrand factor (VWF) and blood pressure of pregnant women in Makassar.

Methodology

Study Type

The study design was cross sectional study by measurement or observation at same period (one point approach) to understand relationship between variables.

Location and Time

The study was conducted in August until November 2015. This study was conducted at public health center, Puskesmas in Makassar: PuskesmasLayang, PuskesmasMalimonganBaru and PuskesmasKalukuBodoa.
Population and Sample

The population in this study was all pregnant women in PuskesmasLayang, PuskesmasMalimonganBaru and PuskesmasKalukuBodoa. In this study, the samples were 37 pregnant women. The samples was using nonrandom (non-probability sampling) with “consecutive sampling” technique that that met criteria included:

i) Aged 17-35 years

ii) Primigravida or first pregnancy

iii) No history of chronic hypertension

Data Analysis

The univariate and bivariate analysis were used in this study. The univariate analysis included respondent characteristic, blood pressure and VWF level. The bivariate analysis was used chi-square used to analyze relationship between variable levels of VWF and blood pressure variables by SPSS program. The T test was used to determine mean difference of blood pressure based on respondent's VWF level. The blood samples were examined at Nechri Laboratory of Hasanuddin University.

Result and Discussion

Univariate Analysis

Based on Table 1, there were 31 respondents aged between 20-35 years and only 6 respondents aged less than 20 years. Meanwhile, 15 respondents (40.5%) were completed high school level. Meanwhile, 29 respondents (78.4%) were unemployed and only 2 worked as teacher or government sector. There were 19 respondents (51.4%) had pregnancy period in trimester II and only 18 respondents (48.6%) was pregnant in trimester III.

Based on Table 2, maximum systolic and diastolic blood pressures on pregnant women were 120 mmHg and 80mmHg. Meanwhile, minimum systolic and diastolic blood pressures were 85 mmHg and 60mmHg on pregnant women. The mean for the systolic and diastolic blood pressure were 101.08mmHg and 70.81 mmHg. Besides, median for both type of blood pressure on pregnant women were 100 mmHg and 70mmHg.

In Table 3, the maximum and minimum value of (VWF) content in pregnant women was 568.79 ng/ml. Besides, median for VWF content was 358.71 ng/ml.

Table 1. Respondent characteristic of pregnant women in Makassar city (2015)

<table>
<thead>
<tr>
<th>Respondent Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20 years</td>
<td>6</td>
<td>16.2</td>
</tr>
<tr>
<td>20-35 years</td>
<td>31</td>
<td>83.8</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incompleted primary school</td>
<td>1</td>
<td>2.7</td>
</tr>
<tr>
<td>Primary school</td>
<td>6</td>
<td>16.2</td>
</tr>
<tr>
<td>Middle school</td>
<td>7</td>
<td>18.9</td>
</tr>
<tr>
<td>High school</td>
<td>15</td>
<td>40.5</td>
</tr>
<tr>
<td>Academy/ College</td>
<td>8</td>
<td>21.6</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployment</td>
<td>29</td>
<td>78.4</td>
</tr>
<tr>
<td>Laborer</td>
<td>1</td>
<td>2.7</td>
</tr>
<tr>
<td>Entrepreneurs/traders</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Private employees</td>
<td>3</td>
<td>8.1</td>
</tr>
<tr>
<td>Teacher/ government sector</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Pregnancy Trimester</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trimester II (13-28 weeks)</td>
<td>19</td>
<td>51.4</td>
</tr>
<tr>
<td>Trimester III (29-40 weeks)</td>
<td>18</td>
<td>48.6</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Primary Data, 2015

Table 2. Minimum value, maximum value, mean and median of blood pressure on pregnant women in Makassar 2015

<table>
<thead>
<tr>
<th>Blood pressure (mmHg)</th>
<th>N</th>
<th>Maximum value</th>
<th>Minimum value</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic</td>
<td>37</td>
<td>120</td>
<td>85</td>
<td>101.08</td>
<td>100</td>
</tr>
<tr>
<td>Diastolic</td>
<td>37</td>
<td>80</td>
<td>60</td>
<td>70.81</td>
<td>70</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015
Table 3. Maximum value, minimum value, mean and median Von Willebrand factor (VWF) level in pregnant women

<table>
<thead>
<tr>
<th>Von Willebrand factor (ng/ml)</th>
<th>Maximum value</th>
<th>Minimum value</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>568.79</td>
<td>133.18</td>
<td>363.41</td>
<td>358.71</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015

**Bivariate Analysis**

Based on Fisher test which shown in Table 4, the pregnant women with VWF level below median mostly and systolic blood pressure above median (66.7%). Besides, the pregnant women with VWF level above the median, most had systolic blood pressure above the median (89.5%). There were 6 respondents that their VWF level was above median had tended with systolic blood pressure below median. Meanwhile, only 2 respondents with VWF level above median had systolic blood pressure below than median. In additions, 17 respondents had VWF level above median also had systolic blood pressure above median. There was no significant relationship between Von Willebrand factor (VWF) and systolic blood pressure in the pregnant women (p=0.09>0.05).

Based on Fisher test which shown in Table 5, the pregnant women with VWF level below median mostly and systolic blood pressure above median (83.3%). There were 15 respondents that their VWF level was above the median had tended with systolic blood pressure below the median. Meanwhile, only 3 respondents with VWF level above median had systolic blood pressure below than median. There was no significant relationship between Von Willebrand factor (VWF) and diastolic blood pressure in pregnant women (p=0.0643>0.05).

Based on Table 6, pregnant women in trimester II had systolic blood pressure above median (73.7%). Meanwhile, pregnant women in trimester III had systolic blood pressure above than median (83.3%). This study showed there was no significantly relationship between pregnancy trimester and systolic blood pressure on pregnant women (p=0.379>0.05).

Table 4. Relationship between the Von Willebrand factor (VWF) with systolic blood pressure

<table>
<thead>
<tr>
<th>VWF level</th>
<th>Systolic blood pressure</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;Median %</td>
<td>≥Median %</td>
</tr>
<tr>
<td>&lt;Median</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>≥Median</td>
<td>2</td>
<td>10.5</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>21.6</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015

Table 5. Relationship between the Von Willebrand factor (VWF) with diastolic blood pressure

<table>
<thead>
<tr>
<th>VWF level</th>
<th>Diastolic blood pressure</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;Median %</td>
<td>≥Median %</td>
</tr>
<tr>
<td>&lt;Median</td>
<td>3</td>
<td>16.7</td>
</tr>
<tr>
<td>≥Median</td>
<td>3</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>16.2</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015
Table 6. Pregnancy trimester and systolic blood pressure in pregnant women in Makassar

<table>
<thead>
<tr>
<th>Pregnancy Trimester</th>
<th>Systolic blood pressure</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;Median</td>
<td>%</td>
</tr>
<tr>
<td>Trimester II</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td>Trimester III</td>
<td>3</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>21.6</td>
</tr>
</tbody>
</table>

Source: Primary data, 2015

Overall Discussion

In this study, pregnant women are aged between 17 years and 35 years and most of respondents were aged between 20 years and 35 years old (83.8%). In a study, young primigravidae aged less than 20 years and over 30 years had high risk in hypertension\(^1\). In additions, a study suggested labor and delivery complication were related with maternal age\(^1\). Meanwhile, a study found hypertension in mother had correlated with hematological profile of infants\(^1\). Most of pregnant women had high education level was completed high school or equivalent (40.5%). This study had assumed pregnant women had knowledge in antenatal care and hypertension risk. In China, a study found low education level influenced hypertensive disorders in pregnancy through multivariate logistic regression analysis\(^1\).

All respondents had systolic and diastolic blood pressure in normal level (normotension). The results also found mean of systolic and diastolic blood pressure were 101.08 mm Hg and 70.81 mm Hg. The minimum values of systolic and diastolic blood pressure were 85 mmHg and 60 mmHg.

The blood pressure data was obtained did not vary (homogenous) since all respondents were in normotension level. The probability was due to blood pressure measurement error. Besides, blood pressure measurement was due to different blood pressure measurement tool. The Von Willebrand factor (VWF) was examined by ELISA method. The average of VWF content of respondent samples was 363.41 ng/ml. The minimum VWF content was 133.18 ng/ml, while maximum of VWF level was 568.79 ng/ml. Based on this study, there was no significant relationship between VWF level and systolic and diastolic blood pressure in pregnant women. This result due to all blood pressure samples was in normotension level. Although, there was tendency that VWF level increased in pregnant women with systolic blood pressure that above median.

Conclusion

In conclusions, no significant relationship between Von Willebrand factor (VWF) and systolic blood pressure in pregnant women in Makassar. The pregnant women with VWF level below or above median both had systolic blood pressure above median. In additions, no significant relationship between Von Willebrand factor (VWF) level and diastolic blood pressure in pregnant women. Besides, pregnant women with VWF level below or above median both had diastolic blood pressure above median. The Von Willebrand factor (VWF) on pregnant women suffered preeclampsia was suggested becoming biomarkers on preeclampsia prevention and treatment.

Acknowledgment: The author would like to acknowledge the support from PuskesmasLayang, PuskesmasMalimonganBaru, PuskesmasKalukuBodoa and Faculty of Public Health, Hasanuddin University.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Correlation between Body Mass Index and Physical Activity on Menstrual Cycle in Young Adult

Hasmawati Rasyid¹, Andi Besse Ahsaniyah¹, Ita Rini¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

Menstrual cycle disorder are an important indicator showed the presence of reproductive system disruption. The body mass index (BMI) and physical activity are among factors caused menstrual cycle disorders. This study aimed to determine relationship between BMI and physical activity and menstrual cycle in young adults. This study was used analytic observational research design by using cross sectional method. The study population were female students in Faculty of Medicine, Hasanuddin University which total of 306 students in 2014. Meanwhile, the study sample sizes were 76 female student that met the inclusion criteria such as students in 2014 and willing to be study respondents. The data was collected included BMI level using Asia Pacific Cohort Collaboration classification table, physical activity was using International Physical Activity Questionnaire and the menstrual cycle using the observation sheets. The result found relationship between BMI toward menstrual cycle had p-value=0.001. Meanwhile, the statistical test on relationship between physical activity toward menstrual cycle had p-value=0.023.

Keywords: Female students; International physical activity questionnaire; Oligomenorrhea; Obesity; Polymenorrhea; Underweights

Introduction

Menstrual cycle plays important in women reproductive health which have 4 dimensions consists of regularity, menstrual frequency, menstrual duration and menstrual blood volume¹. In general, first menstrual cycle occurs on female aged between 12 years to 15 years old and end around age of 50 years². Most female have their menstruation between 2 days and 7 days and normal cycle ranges from 21 days to 45 days³.

Factors that plays role in the menstrual cycle regularity and flow such as hormone changes, genetics, serious medical conditions, body mass index (BMI) and psychological well-being also affects menarche age and common menstrual problem⁴. Menstrual disorders are an important indicator of reproductive system function disruption which associated with increasing risk of various diseases such as uterine and breast cancer, infertility and bone fracture. The menstrual disorder such as irregularities menstrual cycle are major problem among female adults especially teenagers that leads anxiety⁵. Approximately, 87% of female with irregular menstrual cycles suffers the polycystic ovary syndrome (PCOS), oligomenorrhea (>35 days) and contributed to ovarian dysfunction and insulin resistance among PCOS women⁶.

Body Mass Index (BMI) is calculated based on weight and height (weight/ (height)²). In worldwide, there are more than 1 billion overweight adults and approximately 300 million people are under obesity⁷. There are more than 35% of men and nearly to 40% of women are overweight or obesity and increase among people age between 20 years and 40 years⁸. Several studies found the correlation between obesity and the reproductive system problem such as high risk in menstua disorder and anovulation which obese women had risk of 3 times of anovulation compared to normal weight women⁹.

The physical activity is also associated with the menstrual cycle regularity. Besides, benefit of physical activities for women health such as reduces risk of cardiovascular disease, breast and colon cancers diabetes mellitus, osteoporosis and other diseases¹⁰. Based on the observation, there were 41 female students had BMI that above normal limit and some female students also
suffered abnormal menstrual cycles. This study aims to determine relationship between BMI and physical activity and menstrual cycle in young adults.

**Methodology**

**Study design**

The study was used analytic observational research design with cross sectional design.

**Study location and time**

The study was conducted in Faculty of Medicine, Hasanuddin University on 23rd February until 28th February 2017.

**Study population and sample**

The study population was all female students in Faculty of Medicine, Hasanuddin University in year 2014. Meanwhile, the study samples were 76 female study that met the inclusion criteria such as student in the faculty in 2014, willing to be respondents, no any reproductive medicine consumption and no any diet program joining.

**Data Collection**

The data was collected by using the questionnaire which the question about the physical activity performance in last 7 days and BMI measurement. The weight and height data were obtained through direct measurement. The BMI value was measured by body weight data using one-med scales and body height measurement using stature meter. BMI value was interpreted according to Asia Pacific Cohort Studies Collaboration table. Meanwhile, physical activity was measured using International Physical Activity Questionnaire (IPAQ). The menstrual cycle data was recorded in observation sheet.

**Data analysis**

The data was analysed used descriptive bivariate analysis to determine relationship between BMI and physical activity toward menstrual cycle in young adults. The chi square test also performed with SPSS program. The data was presented in the tables and narratives form.

**Results and Discussion**

**Univariate analysis**

In Table 1, 27 respondents (35.5%) were obesity I and 18 respondents (23.7%) were normal in BMI. Meanwhile, 11 respondents (14.5%) were underweight and 4 respondents (5.3%) were at risk for obesity. In additions, 53 respondents (69.7%) had less physical activity and 10 respondents (13.2%) were active in the physical activity. The menstrual cycle was divided into 3 categories such as oligomenoreoa, normal and polimenoreoa. Meanwhile, 37 respondents (48.7%) were normal in menstrual cycle and 27 respondents (35.5%) suffered oligomenorea. There were 12 respondents (15.8%) suffered Polymenoreoa in menstrual cycle.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>11</td>
<td>14.5</td>
</tr>
<tr>
<td>Normal</td>
<td>18</td>
<td>23.7</td>
</tr>
<tr>
<td>Overweight</td>
<td>5</td>
<td>6.6</td>
</tr>
<tr>
<td>At risk</td>
<td>4</td>
<td>5.3</td>
</tr>
<tr>
<td>Obesity I</td>
<td>27</td>
<td>35.5</td>
</tr>
<tr>
<td>Obesity II</td>
<td>11</td>
<td>14.5</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100.00</td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy</td>
<td>10</td>
<td>13.2</td>
</tr>
<tr>
<td>Medium</td>
<td>13</td>
<td>17.1</td>
</tr>
<tr>
<td>Less</td>
<td>53</td>
<td>69.7</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100.00</td>
</tr>
<tr>
<td>Menstrual cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oligomenoreoa</td>
<td>27</td>
<td>35.5</td>
</tr>
<tr>
<td>Normal</td>
<td>37</td>
<td>48.7</td>
</tr>
<tr>
<td>Polymenoreoa</td>
<td>12</td>
<td>15.8</td>
</tr>
<tr>
<td>Total</td>
<td>76</td>
<td>100.00</td>
</tr>
</tbody>
</table>

**Bivariate analysis**

Furthermore, 1 respondent suffered oligomenorea was underweight and 18 respondents were under obesity I. Besides, 4 respondents suffered oligomenorea were under obesity II. For normal menstrual cycle, there was 16 respondents was normal and 1 respondent was under risk for BMI level. Meanwhile, 5 respondents suffered polimenoreoa were underweight and 3 respondents were obesity II. The chi square test showed there was significant relationship between BMI and menstrual cycle in young adult with p= 0.001<0.005.
In Table 3, there were 6 respondents that very active and 13 respondents had less in physical activities suffered oligomenorea menstrual cycle. Meanwhile, 31 respondents were less active, and 3 respondents were active in physical activities that normal in menstrual cycle. In additions, 9 respondents had less physical activity and 1 respondent who very active in physical activity that suffered polymenorea. The chi square test showed there was no significant relationship between physical activity and menstrual cycle in young adults with p=0.023>0.05.

Table 2. Relationship between BMI toward menstrual cycle

<table>
<thead>
<tr>
<th>BMI</th>
<th>Menstrual cycle</th>
<th>Total (n)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oligomenorrhea</td>
<td>Normal</td>
<td>Polymenorrhea</td>
</tr>
<tr>
<td></td>
<td>(n)</td>
<td>(n)</td>
<td>(n)</td>
</tr>
<tr>
<td>Underweight</td>
<td>1(3.9%)</td>
<td>5(5.2%)</td>
<td>5(1.9%)</td>
</tr>
<tr>
<td>Normal</td>
<td>1(6.4%)</td>
<td>16(8.5%)</td>
<td>1(3.1%)</td>
</tr>
<tr>
<td>Overweight</td>
<td>1(1.8%)</td>
<td>3(2.4%)</td>
<td>1(0.9%)</td>
</tr>
<tr>
<td>At risk</td>
<td>2(1.4%)</td>
<td>1(1.9%)</td>
<td>1(0.7%)</td>
</tr>
<tr>
<td>Obesity I</td>
<td>18(9.6%)</td>
<td>7(12.8%)</td>
<td>2(4.6%)</td>
</tr>
<tr>
<td>Obesity II</td>
<td>4(3.9%)</td>
<td>4(5.2%)</td>
<td>3(1.9%)</td>
</tr>
<tr>
<td>Total</td>
<td>27(35.5%)</td>
<td>36(48.7%)</td>
<td>13(15.8%)</td>
</tr>
</tbody>
</table>

Table 3. Relationship between physical activities toward menstrual cycle

<table>
<thead>
<tr>
<th>Physical activity</th>
<th>Menstrual cycle</th>
<th>Total (n)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oligomenorrhea</td>
<td>Normal</td>
<td>Polymenorrhea</td>
</tr>
<tr>
<td></td>
<td>(n)</td>
<td>(n)</td>
<td>(n)</td>
</tr>
<tr>
<td>Heavy</td>
<td>6(3.6%)</td>
<td>3(4.7%)</td>
<td>1(1.7%)</td>
</tr>
<tr>
<td>Medium</td>
<td>8(4.6%)</td>
<td>2(6.2%)</td>
<td>3(2.2%)</td>
</tr>
<tr>
<td>Light</td>
<td>13(18.8%)</td>
<td>31(25.1%)</td>
<td>9(9.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>27(35.5%)</td>
<td>36(48.7%)</td>
<td>13(15.8%)</td>
</tr>
</tbody>
</table>

Overall Discussion

In this study, there were 27 female students (35.5%) had suffered oligomenorea, 36 female students had normal menstrual cycle and 13 female students had suffered polymenorea. These results showed women had high BMI level which high body fat (obesity category) had increment in androstenedione produce. The androstenedione is androgen that served as precursor of reproductive hormones. In the body, androgen is used to produce estrogen with aid of aromatase enzymes. This androgen-induced aromatization process occurs in granulosa and fat tissue. Thus, more fat body percentage, more estrogen is formed which disturb the hormone. Hossain (2011) found the student in one university that had high BMI level is likely to experience menstrual cycle disorder.

In additions, women hormones such as progesterone, estrogen, LH and FSH were closely correlated with hormone disorder. The disruption of hormone system also associate with high body fat percentage. Besides, high body fat affected the estrogen hormone metabolism in the female reproductive system. The menstrual cycle disruption is caused by high rate of estrogen disturbance until Follicle Stimulating Hormone (FSH) did not reach...
the peak. Thus, the follicle was ceases and no ovulation occurs and affected the menstrual cycle period. The rapid in estrogen level leads positive feedback toward the hypothalamus and pituitary gland that contributed increment in L.H. Overweight caused irregular menstrual cycle and estrogen production tens to exaggerate leads to metabolism disorder. Excess body fat causes interference with ovarian function and proliferation phase is longer than classical menstrual cycles.

Furthermore, 6 respondents were active, 8 respondents were medium and 13 respondents were inactive in the physical activities had suffered oligomenorea. Meanwhile, 3 respondents were active, 2 respondents were medium and 31 respondents were less in the physical activities and had normal menstrual cycle. In additions, 1 respondent were active, 3 respondents were medium, and 9 respondents were less active in the physical activities and suffered poligenorea.

The study also showed there was significant relationship between BMI with menstrual cycle in young adults (p=0.001<0.05) Meanwhile, there was no significant relationship between physical activity and menstrual cycle in young adult (p=0.023>0.05). The normal menstruation period were between 3 days until 7 days. Several physical activities affected menstrual cycle disorders and change follicular phase to its normal phase.

This study showed most students have medium of physical activity and suffered oligomenorea menstrual cycle disorder due to overweight or obese. Hence, the physiotherapist roles in women health that provides advice on the food consumption to balance the body energy and to regulate physical activity.

Acknowledgement: The author would like to thank to all respondents and Faculty of Medicine, Hasanuddin University for unconditional support.

Conclusion

In conclusion, there was significant relationship between BMI toward menstrual cycle in young adult. Meanwhile, there was no significant relationship between physical activity toward menstrual cycle in young adults. These results showed BMI factor had more influence on the regularity of menstrual cycle in the young adult compared to their physical activity. This study is expected to be consideration for physiotherapists that needed to focus on the women education especially physiotherapy since the reality showed physiotherapy is more focused on neuropsychiatry and musculoskeletal.

Ethical Clearance: Taken from the committee.

Source of Funding: Nil

Conflict of Interest: Nil

References

5. Thapa B, Shrestha T. Relationship between body mass index and menstrual irregularities among the adolescents. International Journal of Nursing Research and Practice. 2015;2(2).


Factor Related to the Occurrence of Anemia and Obedience in Consuming FE Tablets in Pregnant Women at Mamajang Public Health Center, Makassar

Hastuti Husain1, Ema Alasiry1, Irfan Idris1

1Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract
Anemia in pregnant women is still common and one of factors thought to be the cause is the disobedience of pregnant women in consuming Fe tablets. The purpose of this study is to find out the factors related to the occurrence of anemia and the obedience in consuming Fe tablets in pregnant women. This quantitative study which used the cross sectional design was conducted from November to December 2014 at Mamajang Public Health Center with 60 samples of pregnant women. The data were collected using questionnaires. A statistical analysis with cross-tabulation was conducted after that, followed by a chi-square test. Factors associated with anemia are the size of upper arm circumference (p=0.003) and obedience in consuming Fe tablets (p=0.003) whereas factors related to obedience in consuming Fe tablets are quality of antenatal care (p=0.047). This shows that pregnant women’s obedience in consuming Fe tablet is significantly correlated with the occurrence of anemia in pregnant women.

Keywords: Anemia; Fe tablets; gravid status; midwives; pregnancy

Introduction
Quality of antenatal care can detect the occurrence of risk in pregnancy, getting access to quality pregnancy care, obtaining opportunities in early detection of complications that may arise so maternal death can be avoided1. In Indonesia, prevention programs for anemia in pregnant women provided iron supplements as many as 90 tablets during pregnancy. The Ministry of Health recommends that pregnant women consume at least 90 iron pills during pregnancy which contain 60 mg of elemental iron and 0.2% of folic acid taken 1 tablet a day. Adherence to drinking Fe tablets if ≥ 90% of iron tablets should be taken2. Compliance with pregnant women taking iron pills is an important factor in ensuring an increase in hemoglobin levels of pregnant women. Nonetheless, due to various factors such as lack of knowledge, attitudes and actions of pregnant women who are not good, the side effects caused by the tablet can trigger a person to not adhere to the consumption of iron tablets properly, thus the purpose of giving the tablet is not achieved3.

According to the Indonesian Ministry of Health, the low compliance of pregnant women in consuming iron supplements is one of the causes of anemia prevalence rates to remain high. The results of Sadariah4 study, showed that there were 39.9% pregnant women who suffered from anemia and there were 37.2% pregnant women who did not obey to consuming iron tablets. From research conducted by Purwaningsih5, around 40% - 50% of mothers do not adhere to drinking Fe tablets. Likewise, Maisa’s study stated that out of 30 pregnant women who were anemic, 30% of them did not obey drinking Fe tablets6. Data from Risdiknakes7 showed that iron consumption and variations in the amount of iron intake during pregnancy in Indonesia amounted to 89.1%. From these data, it was found that among those who consumed iron, there were 33.3% of pregnant women who consumed a minimum of 90 days during pregnancy, while 34.4% of pregnant women consumed less than 90 days and the other 21.4% forgot how much Fe tablets they consumed per day8.
Anemia in pregnant women has an impact on the health and safety of the mother also has an impact on the quality of the baby to be born. The incidence of anemia in pregnant women is still high even though in every antenatal examination iron tablets have been given according to the government’s policy of 90 tablets during pregnancy. The purpose of this study was to determine the factors associated with the incidence of anemia and adherence of pregnant women in consuming Fe (iron) tablets.

Methodology

Research Type

The research type is a quantitative study with an analytical survey approach using the cross sectional study design. Independent and dependent variables are observed at the same time and there is no follow-up.

Location and Time of Research

This research was carried out at Mamajang Health Center for 2 months from November to December 2014 until the research sample was sufficient.

Population and Sample

The population in this study was all pregnant women who were examined for pregnancy in November - December 2014. Sampling was done using purposive sampling technique with regard to inclusion and exclusion criteria. The 60 pregnant women who were sampled were those who had repeated pregnancy checks and had obtained Fe tablets at the previous examination and were also willing to become respondents.

Data collection

The data collected are primary data derived from the questionnaire answers of pregnant women along with the results of observations of midwives who conduct prenatal checks. Secondary data is seen in the visit book to see previous inspection history.

Data analysis

Data analysis was carried out in stages, namely univariate analysis which aimed to explain the characteristics of each variable of bivariate research and analysis conducted on two variables that were allegedly related or correlated between independent variables and dependent variables with Chi Square test. The data was analyzed using the SPSS version 21.

Results

Univariate analysis

Table 1 shows the relationship between characteristics of pregnant women and the incidence of anemia. In the age category, the proportion of pregnant women who experienced anemia was 43.75% higher in mothers of high risk age than in mothers of low risk age (43.18%). As for the education category, the proportion of anemia was highest in diploma level (50.00%) and the lowest was in the junior secondary education category (0%). While in the occupational category, the proportion of anemia was highest in civil sector (50%) and the lowest was in traders (0%). For the gestational age category, it was seen that the proportion of pregnant women who experienced anemia in the first trimester of pregnancy (50%) and decreased respectively with increasing gestational age, namely in Trimester II (43.75%) and gestational age III Trimester (42.31%). In the gravida category, it was shown that the proportion of pregnant women who suffered the most anemias was multigravida (47.92%) compared to primigravida (25.00%). For the pregnancy gap category, it can be seen that the proportion of anemia occurrence is more common at high risk pregnancy interval (48.39%) than the low risk group (37.93%). The proportion of anemia in pregnant women with chronic energy malnutrition (CEM) was higher (68.18%) than in the maternal that do not suffer from CEM (28.95%).

Anemia occurs more frequently in pregnant women who state that the quality of antenatal care is according to the standard of 46.81%, while the incidence of anemia in pregnant women who state that the antenatal quality is not standardized is 30.77%. The proportion of anemia occurrences in non-compliant mothers consumed Fe tablets was 72.22% while the incidence of anemia in pregnant women who obeyed consuming Fe tablets was 30.95%. 
Table 1. Relationship characteristics of pregnant women with the incidence of anaemia

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Anaemic status</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N = 26</td>
<td>%</td>
<td>N = 34</td>
</tr>
<tr>
<td>Maternal age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High risk</td>
<td>7</td>
<td>43.75</td>
<td>9</td>
</tr>
<tr>
<td>Low risk</td>
<td>19</td>
<td>43.18</td>
<td>25</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior high school</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Senior high school</td>
<td>21</td>
<td>48.84</td>
<td>22</td>
</tr>
<tr>
<td>Diploma</td>
<td>2</td>
<td>50.00</td>
<td>2</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>3</td>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>22</td>
<td>44.90</td>
<td>27</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>2</td>
<td>33.33</td>
<td>4</td>
</tr>
<tr>
<td>Trader</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Civil employee</td>
<td>2</td>
<td>50.00</td>
<td>2</td>
</tr>
<tr>
<td>Pregnancy gestation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I Trimester</td>
<td>1</td>
<td>50.00</td>
<td>1</td>
</tr>
<tr>
<td>II Trimester</td>
<td>14</td>
<td>43.75</td>
<td>18</td>
</tr>
<tr>
<td>III Trimester</td>
<td>11</td>
<td>42.31</td>
<td>15</td>
</tr>
<tr>
<td>Gravida</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primigravida</td>
<td>3</td>
<td>25.00</td>
<td>9</td>
</tr>
<tr>
<td>Multigravida</td>
<td>23</td>
<td>47.92</td>
<td>25</td>
</tr>
<tr>
<td>Pregnancy gap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High risk</td>
<td>15</td>
<td>48.39</td>
<td>16</td>
</tr>
<tr>
<td>Low risk</td>
<td>11</td>
<td>37.93</td>
<td>18</td>
</tr>
<tr>
<td>MUAC measurement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has CME (&lt;23.5 cm)</td>
<td>15</td>
<td>68.18</td>
<td>7</td>
</tr>
<tr>
<td>No CME (&gt;23.5 cm)</td>
<td>11</td>
<td>28.95</td>
<td>27</td>
</tr>
<tr>
<td>Antenatal care quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>4</td>
<td>30.77</td>
<td>9</td>
</tr>
<tr>
<td>High</td>
<td>22</td>
<td>46.81</td>
<td>25</td>
</tr>
<tr>
<td>Fe tablet consumption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incompliant</td>
<td>13</td>
<td>72.22</td>
<td>5</td>
</tr>
<tr>
<td>Compliant</td>
<td>13</td>
<td>30.95</td>
<td>29</td>
</tr>
</tbody>
</table>
Table 2 shows the characteristics of pregnant women based on compliance consuming Fe tablets. In the age category, the proportion of pregnant women who obeyed consuming Fe tablets was 75.00% higher in mothers of high risk age than in mothers of low risk age (68.18%). In the education category, the proportion of pregnant women who obeyed consumed the most Fe tablets at the high school level of education were 35.53% meanwhile the lowest were in the junior high school (0%) and diploma (0%) categories. In the occupational category, the proportion of mothers who adhered to consumed the most Fe tablets were housewives (36.73%). The proportion in the work of other pregnant women was 0%. In the gravida category, it was shown that the proportion of pregnant women who consumed the most Fe tablets were multigravida mothers (35.42%) compared to primigravida mothers (8.33%). While in the ANC quality category, it was seen that the proportion of pregnant women who obeyed to consume Fe tablets were pregnant women which stated that the quality of service was not standard (92.31%) compared to pregnant women stated that the quality of service according to the standard was 63.83%.

### Table 2. Relationship characteristics of pregnant women with compliance to consume Fe tablet

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Anaemic status</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N = 42</td>
<td>N = 18</td>
<td>N = 60</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Maternal age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High risk</td>
<td>18</td>
<td>22</td>
<td>0.610</td>
</tr>
<tr>
<td>Low risk</td>
<td>0</td>
<td>1</td>
<td>0.75</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior high school</td>
<td>0</td>
<td>1</td>
<td>0.00</td>
</tr>
<tr>
<td>Senior high school</td>
<td>13</td>
<td>21</td>
<td>0.35</td>
</tr>
<tr>
<td>Diploma</td>
<td>0</td>
<td>1</td>
<td>0.00</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>1</td>
<td>1</td>
<td>0.83</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>18</td>
<td>31</td>
<td>0.00</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>0</td>
<td>6</td>
<td>0.00</td>
</tr>
<tr>
<td>Trader</td>
<td>0</td>
<td>1</td>
<td>0.00</td>
</tr>
<tr>
<td>Civil employee</td>
<td>0</td>
<td>4</td>
<td>0.00</td>
</tr>
<tr>
<td>Gravida</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primigravida</td>
<td>1</td>
<td>11</td>
<td>0.83</td>
</tr>
<tr>
<td>Multigravida</td>
<td>17</td>
<td>31</td>
<td>0.35</td>
</tr>
<tr>
<td>Antenatal care quality</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>30</td>
<td>17</td>
<td>0.63</td>
</tr>
<tr>
<td>High</td>
<td>12</td>
<td>1</td>
<td>0.92</td>
</tr>
</tbody>
</table>

### Bivariate Analysis

In the results of statistical tests, the characteristics of pregnant women associated with anemia were the measurement of MUAC and compliance to consuming Fe tablets with a p value > 0.05. While maternal age, education, occupation, gestational age, pregnancy distance, gravida status and antenatal quality were not associated with the incidence of anemia.

Statistical test results for MUAC measurement category showed that p value = 0.003 which indicated there was a significant relationship between MUAC and the incidence of anemia in pregnant women. While the results of the statistical compliance test consuming Fe tablets showed that p value = 0.003, which proved there is a significant relationship between adherences to
consuming Fe tablets with the incidence of anemia in pregnant women.

The results of statistical tests of maternal age categories had p value = 0.969 which showed there was no relationship between maternal age and the incidence of anemia. In the education category, p value = 0.390 showed there was no relationship between education and the incidence of anemia. Job category shows p value = 0.770 which means there is no significant relationship between maternal occupation and anemia. In the gestational age category showed that p value = 0.852, referred to as no relationship between gestational age and the incidence of anemia in pregnant women. Gravida status category shows p value = 0.152, which means that there is no relationship between gravida status and the incidence of anemia in pregnant women. Pregnancy gap category shows that p value = 0.414, which point towards no relationship between the period of pregnancy and the incidence of anemia in pregnant women. Antenatal quality categories showed that p value = 0.302 which showed that there was no relationship between antenatal quality and the incidence of anemia.

The results of the statistical test in Table 2 showed that the factors associated with adherence to consuming Fe tablets were the quality of ANC with p <0.05, while age, education, occupation, and gravida status had no relationship with consuming Fe tablets with a p value> 0.05.

ANC quality statistical test results obtained p value = 0.047, indicating a significant relationship between antenatal care quality and the compliance to consuming Fe tablets. In the maternal age category, p = 0.610, proving there was no significant relationship between maternal age and compliance with consuming Fe tablets. For the education category, occupational category and Gravida status category, the results of p value was 0.083, 0.123 and 0.067 respectively which showed that there was no significant relationship between any of these categories and maternal adherence in consuming Fe tablets.

**DISCUSSION**

The results of this study show an overview of the incidence of anemia in pregnant women. MUAC measurement in a group of women of childbearing age is one of the ways for early detection of CEM that can be easily carried out by ordinary people. Compliance with consuming Fe tablets has a significant relationship with the incidence of anemia in pregnant women. The same results were also obtained by Salmariantity, with a value of p = 0.021.

Based on the results of interviews with pregnant women, data was obtained that all pregnant women who were not adherent to consuming Fe tablets because they had complaints on nausea, dizziness and difficulty in defecation. Consumption of iron tablets of pregnant women is sufficient if pregnant women have consumed 90 Fe tablets with each tablet containing 60 mg of elemental iron and 0.2% of folic acid which is taken once a day. Iron supplementation or administration of Fe tablets is an important effort in preventing and overcoming anemia, especially iron deficiency anemia.

The results showed that gestational age did not have a relationship with the incidence of anemia. But there is a difference between the results of research and theory. Consumption of Fe tablets is thought to be the cause of an increase in hemoglobin levels. The same findings were obtained by Windarti, who stated that gestational age was not associated with anemia. But research conducted by Salmariantity disagreed and stated that there is a relationship between gestational age and anemia.

The gravida category showed no relationship between gravida status and the incidence of anemia in pregnant women which is in line with research conducted by Herawati. A mother who often experiences pregnancy and childbirth has a risk of anemia in the next pregnancy if she does not pay attention to nutritional needs. Because during pregnancy, substances - nutrients will be divided for the mother and for the fetus they carry. The research conducted by Nasyidah stated that the gap of pregnancy was related to the incidence of anemia. Nonetheless, the results of the study from Sukasmiyati stated that there was no relationship between the gap of pregnancy and the incidence of anemia.

Anemia occurs more in pregnant women who stated that the quality of antenatal care is in accordance with the standards. If the patient feels satisfied, it means that the health service has quality. Quality services are produced from services performed by health workers in accordance with established standards.

**CONCLUSION AND RECOMENDATIONS**

Factors that influence the incidence of anemia are
MUAC measurement and compliance with consumption of Fe tablets. Quality antenatal care is related to compliance with consumption of Fe tablets in pregnant women. While maternal age, education, occupation, gravida status, and complaints did not have a significant relationship with adherence to consumption of Fe tablets among pregnant women in Mamajang Makassar Public Health Center.

**Acknowledgement:** The authors would like to thank Faculty of Medicine, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Effect of Communication, Information and Education (CIE) on Knowledge and Decision Making of Married Women with Unmet Need in the Family Planning Program at Marusu District Maros City in 2016

Husnah¹, Masni¹, Veni Hadju¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of the study was to analyse the influence of Communications, Information, and Education (CIE) on knowledge and decision making of unmet need in family planning in the District of Marusu, Maros. This study was an experimental research design with nonrandomized pre-test and post-test design. Samples were 45 years old or younger spouses with unmet need and 30 people of parity 1 or 2 in each treatment group, selected with purposive method. Data were collected through pre-test and post-test with a questionnaire followed with analysis using paired T-Test sample and One Way ANOVA. The results indicated that there were differences in knowledge before and after the intervention by the lecture method (p = 0.000), media leaflet (p = 0.009) and the combination of lecture and media leaflet (p = 0.000). The results also showed that there were differences in decision-making before and after the intervention by the lecture method (p = 0.000), media leaflet (p = 0.001) and the combination of lecture and media leaflet (p = 0.000). CIE lecture and leaflets affected the knowledge and decision-making of unmet need in family planning.

Keywords: CIE; decision making; family planning; lecture; media leaflet; unmet need

Introduction

Indonesia is among the world’s four largest populations in the world after China, India, and America. Indonesia accounts for about 6% of the population in Asia. This large number indicated the quantity of Indonesian population is a strategic problem and in terms of quality is still relatively low. In 2007/2008 Indonesia’s Human Development Index (IPM) ranked 117 out of 187 countries. In the 11 members of ASEAN, Indonesia’s Human Development Index (HDI) is ranked 7th. If the birth of the population is not well managed, more new-borns will be born with low quality¹.

The explosion of population will bring implications for increased poverty, declining health status, decreased access to education, increasingly limited employment opportunities, increased crime, increased depression, and deteriorating environmental impacts. Population boom control also has implications for achieving Millennium Development Goals (MDG)’s in Indonesia². Maternal mortality and morbidity in Indonesia is still a big problem. When compared with MMR in developed countries, the number of MMR in Indonesia 50 times of that in developed countries³. One of the government’s strategic programs is believed to reduce maternal mortality and reduce population growth rate through the Family Planning program⁴.

The national family planning movement is prepared to build a prosperous family in order to build optimal human resources, characterizing the increasing role of the community in meeting the need to obtain family planning services. Efforts to reduce MMR are also supported by increasing rates of contraceptive use and reducing unmet need through improved access and quality of family planning services and reproductive health⁵. One of the problems in the management of family planning program is the high rate of unmet need of family planning. Unmet need of family planning is defined as a group of women who actually do not want to have children anymore or want to have infant pregnancy up to 24 months but do not...
used contraception to prevent pregnancy. This concept is widely used to identify women who actually need to use contraception because they do not want children anymore or want to delay pregnancy up to 24 months but not using contraceptives. In other words, women are said unmet need if the woman does not use the method of contrary when she did not want another child or want to delay to have more children.

Unmet need has become a global population problem, especially in developing countries. The reasons women of childbearing age do not use birth control because of their concern about the side effects caused after the use of birth control. Access to services that provide various methods of family planning, as well as information and counselling to help women choose and effectively use appropriate methods is essential in helping women unmet need to overcome barriers to contraceptive use. Factors contributing to low use of family planning include partner decision making, service quality, hospitality of service administration staff, and women’s knowledge of family planning.

Mekonnen and Worku found that one of the factors affecting unmet need is low knowledge about family planning especially contraceptive side effects so the government is expected to focus on improving education and public awareness for family planning with health counselling. Health care providers and discussions on family planning issues are key predictors of unmet need.

The highest unmet need rate in South Sulawesi is Selayar regency, which is 32.28%, while the district with the lowest unmet need rate is Maros Regency, which is 7.36%. Although Maros Regency has the lowest unmet need for family planning in South Sulawesi, but in Marus sub-district, the unmet need rate of family planning is quite high (14.37%). One of the important steps to support and awaken the people about the purpose of family planning program, especially in terms of reducing unmet need rate of family planning is through CIE.

Research conducted by Purba, in Rambah Samo sub-district Rokan Hulu district concluded that some of the causes of low use of contraceptives are lack of information about contraceptives, lack of support from health workers, the cost of buying and installing unreachable contraceptives, and contraceptives not available.

According to the data from BKKBN Maros District, Marus District has the highest unmet need in Maros District from year 2011-2013, where in 2011 as many as 694 couples (12.2%), year 2012 as many as 552 couples (12.6%) and in 2013 as many as 880 couples (16.9%). Although there is a decrease in 2014, which is 820 pairs 15.73%, but this figure is still above the average unmet need rate Maros District. Based on the above description, the authors are interested to examine the influence of CIE using lecture and media leaflet method for decision making of unmet need for family planning in Marusu District, Maros Regency.

Methodology

Study Type

This type of research is experimental with the design of nonrandomized pre-test post-test group design.

Location and Time

This research was conducted for one month since January 2016 until February 2016 in Marusu sub-district, Maros Regency.

Population and Sample

Population in this research is all unmet need family planning in District Marusu Maros Regency in 2014 as many as 805 people spread in 7 villages and from the calculation results, obtained a sample of 30 respondents.

Data Collection

Primary data were obtained through structured questionnaires that contained a number of questions where respondents were asked to choose the answer. Questionnaires are used to measure decision making in choosing contraceptives that have to do with Communication, Information, and Education (CIE). Secondary data is obtained from annual reports of field officers of the sub-district of Marusu, BKKBN of Maros Regency, and other sources.

Data Analysis

Data processing is done using SPSS program. Bivariate analysis was done to determine the effect of CIE on knowledge and right decision-making in family planning. Analysis conducted included t-test, One Way-
ANOVA Test and Post Hoc Test.

Result and Discussion

Knowledge

Table 1 shows that there is an increase in the average score of respondents’ knowledge of family planning after CIE intervention, either by lecture method, using leaflet media, or by a combination of lecture and media leaflet methods. The biggest increase was in respondents who intervened with a combination of lecture method and media leaflet (62.63%). Before the CIE intervention, there was no difference in the average score of respondents’ knowledge about family planning in the three methods (p = 0.974). After CIE intervention with 3 different methods, statistic test result showed that there was difference of mean score of respondent knowledge, p = 0.000. This suggested that there is a difference in knowledge of unmet need on family planning using the three CIE methods. Further analysis proved that a significantly different method is a lecture method with a media leaflet as well as a media leaflet with a combination of lecture and media leaflet methods. The most dominant method of influencing the knowledge of unmet need on family planning is the combination of lecture and media leaflet methods. It can be seen on the value of t arithmetic combination of lecture method and media leaflet is bigger than lecture method (15, 20> 11, 68).

Table 1. Knowledge planning

<table>
<thead>
<tr>
<th>CIE Method</th>
<th>Average Knowledge Score</th>
<th>Mean Score</th>
<th>%</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
<td>6.97</td>
<td>10.97</td>
<td>4.00</td>
<td>57.39</td>
</tr>
<tr>
<td>Leaflets</td>
<td>6.87</td>
<td>7.83</td>
<td>0.96</td>
<td>13.97</td>
</tr>
<tr>
<td>Lecture and Leaflets</td>
<td>6.93</td>
<td>11.27</td>
<td>4.34</td>
<td>62.63</td>
</tr>
<tr>
<td>p**</td>
<td>0.974</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Paired Sample T Test

**One Way ANOVA Test

Decision Making

Table 2 shows that there is an increase in the mean score of respondents’ decision-making in family planning after the CIE intervention, either by lecture method, using leaflet media, or by a combination of lecture and media leaflet methods. The largest increase was in the respondents who intervened with a combination of lecture method and media leaflet (63.55%). Before the CIE intervention, there was no difference in the mean score of respondents’ decision making in the family planning on the three methods (p = 0.836). After CIE intervention with 3 different methods, statistic test result showed the difference of mean score of respondent decision in family planning (p = 0.000). This indicated that there is a difference in decision making on unmet need in family planning among the three CIE methods. Further analysis proved that a significantly different method is a lecture method with a media leaflet as well as combination of lecture and media leaflet methods. The most dominant method of influencing the decision making of unmet need in family planning is the lecture method. It can be seen on t-value of lecture method is greater than the combination of lecture method and media leaflet (10, 15 > 9, 33).

Table 2. Decision Making

<table>
<thead>
<tr>
<th>CIE Method</th>
<th>Average Decision Score</th>
<th>Mean Score</th>
<th>%</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before</td>
<td>After</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecture</td>
<td>14.50</td>
<td>20.70</td>
<td>6.20</td>
<td>42.76</td>
</tr>
<tr>
<td>Leaflets</td>
<td>14.33</td>
<td>16.23</td>
<td>1.90</td>
<td>13.26</td>
</tr>
<tr>
<td>Lecture and Leaflets</td>
<td>13.80</td>
<td>22.57</td>
<td>8.77</td>
<td>63.55</td>
</tr>
<tr>
<td>p**</td>
<td>0.836</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Paired Sample T Test**

**One Way ANOVA Test**

**Overall Discussion**

This study was conducted by collecting primary data through questionnaires from 30 respondents. Before giving intervention 3 methods of CIE to the respondents, pre-test prior to the knowledge and decision making of respondents in family planning were done. The results showed that all three groups of respondents have scores that are almost the same in the knowledge and decision-making of respondents in the family planning. In accordance with the opinion of Arikunto\textsuperscript{16} who argued that one of the requirements of experimental research is to attempt the three groups of respondents in the same conditions so that the exposure of the final result can really be the result of the presence and absence of treatment.

This is in line with Ganiajri\textsuperscript{17} studies, which found that there is a significant difference in girls’ knowledge of reproductive health before and after health education given by lecture method. This is also in line with Malwenna et al.\textsuperscript{18} study, which found that family planning counselling conducted by community health midwives in Kalutara village of Sri Lanka demonstrated a significant impact on knowledge and attitude of family planning and officers leading to changes in family planning practices and decline in incident of unmet need.

This is in line with Akbar\textsuperscript{19} study which found that there is influence of lecture methods on decision scores to accept family planning in Kecamatan Gondang Mojokerto regency. This is in line with research conducted by Kawuriansari et al.\textsuperscript{20}, which found that leaflet media is very effective in increasing girls’ knowledge about dysmenorrhoea. Research conducted by Wijayanti\textsuperscript{21} found that health education using leaflet media can improve the knowledge of tuberculosis patients. Media leaflets have the advantage that people who read can learn independently, view the content in a relaxed manner, information can be shared with family and neighbours can provide detail by using images for message reinforcement.

This is in agreement with research conducted by Hidayati\textsuperscript{22} who found that the use of leaflet media and decision support tool can assist clients in making implanted decisions.

This is also in line with Suraya\textsuperscript{23} study which concluded that lecture and media leaflet extension can improve mothers’ knowledge and attitude about the pattern of giving breast milk to children aged 6-24 months.

**Conclusion**

Overall it can be concluded that there were differences of knowledge before and after intervention with lecture method (p = 0.000), media leaflet (p = 0.009), and combination of lecture and leaflet method (p = 0.000). Other results also showed that there are differences in decision making before and after intervention with lecture method (p = 0,000), media leaflet (p = 0.001), and combination of lecture and media leaflet methods (p = 0.000). CIE methods of lectures and media leaflets do affect knowledge and decision making for fertile aged couples in their unmet need in family planning.

**Acknowldegment:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


10. Okech TC, Wawire NW, Mburu TK. Contraceptive use among women of reproductive age in Kenya’s city slums.


17. Ganiajri F. Differences in Utilization of Flash Multimedia and Lectures as Media for Adolescent Reproductive Health Education for Early Adolescents at Turi 3 Public Middle School, Sleman Regency. Public Health Journal Diponegoro University. 2012;1(2)


Influence of Oxytocin Stimulation Massage toward Women Uterine Involution During Confinement Period with Normal Childbirth

Idha Farahdiba¹, A. Wardihan Sinrang¹, Budu¹
¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia

Abstract

The study aims to determine influence of oxytocin stimulation massage toward women uterine involution during confinement period with normal childbirth. The study was used quasi experimental research design with two group post-tests. The study had been conducted at Public Health Centre (Puskesmas) Batua, Makassar city. The study samples were 82 mothers who in confinement period which intervention group had received oxytocin stimulation massage therapy on 1st, 2nd and 3rd days of confinement period for 10 minutes, while control group had no oxytocin stimulation massage. The fundal height was measured after massage session on 1st, 2nd, 3rd and 7th days of confinement period. The data was analysed using statistical analysis of Mann Whitney U test. The statistical test found stimulation massage toward uterine involution on 1st day (p=0.053), 2nd day (p=0.036), 3rd day (p=0.001), 7th day (p=0.004).

Keywords: Fundal height; Postpartum mother; Oxytocin hormone; Uterine involution;

Introduction

The postpartum period or known as puerperium is first 6 weeks from end childbirth until reproductive organs involution is completed. The postpartum period was period that internal and external changes occur especially psychic transformations which women need care and protection¹. Even though, many physiological changes disappear soon after birth delivery². Besides, this period was period which uterine involution and strengthen ovarian function for new pregnancy³.

The uterine involution is defined uterus size had been return to original non-pregnant size as normal estrous cycle⁴. The uterine involution would be determined by fundal height that difficult in obese women and women with uterine myoma⁵. The lack of uterine contraction during postpartum period affected uterine involution lead to uterine subinvolution⁶. The oxytocin hormone is helpful to improve the uterine contractions after birth delivery for postpartum haemorrhage prevention, while uterine atony occurrence also associated with maternal oxytocin levels. The oxytocin is strongly related with social and affiliative behaviour included beginning of mother-infant bonding and maternal behaviour in mammals⁷. The oxytocin levels are higher in pregnant women and postpartum women than non-pregnant women⁸. The oxytocin massage is spinal massage from fifth or sixth costa until scapula which stimulated parasympathetic nerves so that prolactin and oxytocin hormone are released⁹. The study aims to determine influence of oxytocin stimulation massage toward women uterine involution during confinement period with normal childbirth.

Methodology

Study design: The study was used a quasi-experimental research design with two groups post-test (intervention and control groups) to determine influence of oxytocin stimulation massage on women uterine involution during confinement period with normal childbirth.

Study location and time

The study was conducted from July to August 2015 at Puskesmas Batua, Makassar city.

Study population and sample
The study population were postpartum mother at Puskesmas Batua, Makassar city. The sample sizes were 84 respondents and met study criteria included i) first postpartum mother with normal childbirth; ii) no systemic disease background; iii) good in mental health; iv) aged between 20 years and 35 years. The samples were obtained by using purposive sampling techniques.

Data analysis

The data was analysed using SPSS program. The bivariate analysis had used Mann Whitney U test to compare the women uterine involution between postpartum mothers with received oxytocin stimulation massage and without receiving oxytocin stimulation massage.

Results and Discussion

Bivariate analysis

Based on Table 1, 38 respondents (90.5%) had normal uterine involution and 4 respondents (9.5%) had abnormal uterine involution in the intervention group. Meanwhile, 36 respondents (85.7%) had normal uterine involution and 6 respondents (14.3%) had abnormal uterine involution in control group. The statistical test showed no significant influence between oxytocin stimulation massage and women uterine involution during 1st day of confinement period with normal childbirth at Puskesmas Batua, Makassar city.

Table 1. Relationship between oxytocin stimulation massage toward women uterine involution during 1st day of confinement period with normal childbirth at Puskesmas Batua, Makassar city 2015

<table>
<thead>
<tr>
<th>Oxytocin stimulation massage status</th>
<th>Uterine involution</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>38</td>
<td>90.5</td>
<td>4</td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>85.7</td>
<td>6</td>
</tr>
</tbody>
</table>

Based on statistical test showed there is influence of oxytocin stimulation massage and women uterine involution on 2nd day of confinement period with normal childbirth, $p=0.036<0.05$. There were 3 respondents (7.1%) had abnormal uterine involution in the intervention group and 10 respondents (23.8%) had abnormal uterine involution in the control group.

Table 2. Relationship between oxytocin stimulation massage toward women uterine involution during 2nd day of confinement period with normal childbirth at Puskesmas Batua, Makassar city 2015

<table>
<thead>
<tr>
<th>Oxytocin stimulation massage status</th>
<th>Uterine involution</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>39</td>
<td>92.9</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>76.2</td>
<td>10</td>
</tr>
</tbody>
</table>

Meanwhile, the number of respondents had abnormal uterine involution were increased in 3rd day for control group and vice versa. Based on Table 3, there were 14 respondents (33.3%) had abnormal uterine involution, but only 2 respondents (4.8%) had abnormal uterine involution in the intervention group. The Mann Whitney U test found there is influence of oxytocin stimulation massage toward women uterine involution on 3rd day of confinement period with normal childbirth at Puskesmas Batua, Makassar city.
Table 3. Relationship between oxytocin stimulation massage toward women uterine involution during 3rd day of confinement period with normal childbirth at Puskesmas Batua, Makassar city 2015

<table>
<thead>
<tr>
<th>Oxytocin stimulation massage status</th>
<th>Uterine involution</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>95.2</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>66.7</td>
<td>14</td>
</tr>
</tbody>
</table>

Based on Table 4, the number of respondents had abnormal uterine involution reduced in both groups to 12 respondents (28.6%) in the control group and only 2 respondents (4.8%) in the intervention group. Besides, number of respondents had normal uterine involution were observed increase in the control group from 28 respondents (66.7%) on 3rd day to 30 respondents (71.4%) on 7th day of confinement period. Meanwhile, the statistical result showed there is influence of oxytocin stimulation massage toward women uterine involution during 7th day of confinement period with normal childbirth.

Table 4. Relationship between oxytocin stimulation massage toward women uterine involution during 7th day of confinement period with normal childbirth at Puskesmas Batua, Makassar city 2015

<table>
<thead>
<tr>
<th>Oxytocin stimulation massage status</th>
<th>Uterine involution</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>95.2</td>
<td>2</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>71.4</td>
<td>12</td>
</tr>
</tbody>
</table>

Based on Table 5, mean rank value in the control group was higher than mean rank value in the intervention group on 1st day of confinement period. Based on Mann Whitney U test, there was no difference in women uterine involution between postpartum mother with oxytocin stimulation massage and without oxytocin stimulation massage, p= 0.503>0.05.

In additions, mean rank is observed higher in the control group than intervention group on 3rd day. The Mann Whitney U test found differences on women involution between postpartum mothers with oxytocin stimulation massage and without oxytocin stimulation massage on 3rd day of confinement period with normal childbirth, p=0.001<0.05.

There were differences in mean rank between both groups on 2nd day. The mean rank in the control group was 46.00 higher than 39.00 in the intervention group on 2nd day of confinement period. The statistical test found there was differences in women uterine involution of postpartum mothers with oxytocin stimulation massage and without oxytocin stimulation massage on 2nd day of confinement period with normal childbirth.

On 7th day, the mean rank in the intervention group was 37.50 lower than 47.50 in the control group. There were differences on women uterine involution between postpartum mother with oxytocin stimulation massage and without oxytocin stimulation massage on 7th day of confinement period, p=0.004<0.05.
Table 5. Differences in women uterine involution of postpartum mother with oxytocin stimulation massage and without oxytocin stimulation massage at Puskesmas Batua, Makassar city 2015

<table>
<thead>
<tr>
<th>Mean Rank</th>
<th>Oxytocin stimulation massage status</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>1st day</td>
<td>41.50</td>
<td>43.50</td>
</tr>
<tr>
<td>2nd day</td>
<td>39.00</td>
<td>46.00</td>
</tr>
<tr>
<td>3rd day</td>
<td>36.50</td>
<td>48.50</td>
</tr>
<tr>
<td>7th day</td>
<td>37.50</td>
<td>47.50</td>
</tr>
</tbody>
</table>

**Overall Discussion**

The result found there were differences on women uterine involution between postpartum mothers with oxytocin stimulation massage and without oxytocin stimulation massage on 2nd, 3rd and 7th days of confinement period with normal childbirth. Meanwhile, there was no significant differences on women uterine involution between postpartum mothers with oxytocin stimulation massage and without oxytocin stimulation massage on 1st day of confinement period with normal childbirth. Besides, highest number of respondents had abnormal women uterine involution were 4 respondents in the intervention group on 1st day of confinement period with normal childbirth. The normal uterine involution was observed higher in the intervention group on 2nd, 3rd and 7th days of confinement period. These data suggested oxytocin stimulation massage helped in stimulated release of oxytocin hormone among postpartum mothers especially 1st to 3rd days of confinement period. The oxytocin is helpful in uterine involution improvement. The early breastfeeding also helped in production of oxytocin hormone and stimulated uterus contractions. Few studies which using difference methods and application had found breastfeeding help increased the oxytocin levels in postpartum mothers\(^9\),\(^10\),\(^11\). Based on this early observation, the postpartum mothers without oxytocin stimulation massage had 5 times greater risk in having abnormal uterine involution than postpartum mothers without oxytocin stimulation massage. In Semarang Hospital, oxytocin massage had increased prolactin hormone levels and breastmilk production among post caesarean section\(^9\). A study by Sari et al. found combination of oxytocin massage and endorphin massage help in accelerating uterine involution in normal postpartum mothers\(^6\). The low oxytocin was correlated to higher anxiety and depression contributed to perinatal mood disorder\(^12\),\(^13\). Meanwhile, a study suggested oxytocin levels are higher in women who had normal birth delivery than women undergone caesarean delivery and oxytocin was released during normal labour and breastfeeding\(^14\). The oxytocin hormone is important since this hormone helped increase uterus contractions and prevent the postpartum bleeding occurrence.

**Acknowledgement:** The author would like to thank to all respondents and Puskesmas Batua, Makassar city for resources and data input as well as Faculty of Medicine, Hasanuddin University for unconditionally support.

**Conclusion**

In conclusions, there was an influence of oxytocin stimulation massage toward women uterine involution during 2nd, 3rd and 7th days of confinement period with normal childbirth at Puskesmas Batua, Makassar city. Meanwhile, oxytocin stimulation massage was less effective on women uterine involution on 1st day of confinement period with normal childbirth.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

1. Andrade RD, Santos JS, Maia MAC,de Mello D. factors related to women’s health in puerperium and repercussions on child health. Escola Anna


doi: 10.1016/j.yhbeh.2012.01.014


Smoking Behaviour and the Role of Teachers as Role Model in the Implementation of Smoking Free Area (SFA) In Schools: A Case Study at Sma Negeri 3 Makaletanatoraja District

Ignata Lusmiling Latiang¹, Sudirman Nasir¹, Masni¹
¹Faculty of Public Health, Hasanuddin University, Jl. PerintisKemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this research is to analyse the teachers’ smoking behaviour, knowledge, attitudes and their perceptions regarding smoking and non-smoking area as well as their roles as role models in implementing the smoking free area (SFA) in schools. This is a qualitative case study. The informants of the research were 18 people that consisted of 9 teachers and 9 students. The data were obtained by means of in depth interviews and focus group discussion (FGD). The results show that smoking teachers were no longer smoking in the class except in the teacher’s room and kitchen. The reasons were due to the fact that has not been any ‘No Smoking’ regulation at school and due to difficulty in quitting from smoking. Teachers have actually been aware of the disease cigarettes can generate but they are not yet aware the definition, aim and outcome of the SFA. Majority of the participants agree with the implementation of SFA at school. Teachers who have stopped smoking and non-smoking teachers have perceived smoking as the trigger of serious diseases and even could generate disease to passive smokers. A small minority of smoker teachers perceived that both smokers and non-smokers teachers were vulnerable to disease. Teachers claimed that the implementation of SFA at schools would benefit teachers themselves and other people.

**Keywords:** Attitude; Knowledge; Smoking behaviour; Smoking free area

Introduction

Smoking is one of the main issues that causes of death, disease and poverty. The tobacco epidemic is one of the largest public health threats in the world that has ever been faced for killing about 6 million people per year. More than 5 million of these deaths are due to direct tobacco use. In addition, more than 600,000 are deaths for non-smokers from exposure to second-hand smoke or passive smoking¹.

The direct impact on the individual / smoker can be easily seen in terms of health. Global Tobacco Epidem reported 90% of lung, mouth and respiratory cancers are caused by cigarettes². Cigarettes are also associated with diseases that cause the highest deaths such as ischemic heart disease, cardiovascular disease, lower respiratory tract infections and tuberculosis. Global Youth Tobacco Survey (GYTS) declares Indonesia as the country with the highest teen smoking rate in the world. Most men first smoked at age 12-13 years, and most women first tried smoking at age <7 years and 14-15 years³.

Many studies have studied smoking behaviour in students at school. Research conducted by Apaydin Kaya⁴ found that smoking behaviour in adolescents is influenced by the smoking behaviour of teachers in schools. Teachers are more influential in determining behaviour among young people. Teachers and employees are role models in the School. Teachers and employees interact daily with students so that their group is influential for tobacco control⁵. Middle-income countries can reduce the number of smokers among young people by prohibiting teachers and employees smoking in school⁶. Teachers play a key role in health education for young people, either through the provision of information or as role models for their students. Teachers interact daily with students so that their group is influential for tobacco control in schools.
Data obtained from the interview with one of the teachers found that there are still some teachers and employees who smoke in SMA Negeri 3 Makale. Thus, this study focuses in analysing the teacher’s smoking behaviour at school and evaluating the teacher’s knowledge, attitudes and perceptions about cigarettes and Non-Smoking Areas and their role as role models in the implementation of Non Smoking Areas in schools At SMANegeri 3 MakaleTanaToraja District.

Methodology

Research Design

This research is a qualitative research with case study design. This study is limited by time and place, and cases studied in the form of programs, events, activities or individuals. The case study approach can lead researchers to enter the smallest social units such as associations, groups, families and other forms of social units, which focuses on teachers of SMA Negeri 3 MakaleKabupatenTana Toraja.

Location and Time of Study

This research was conducted at SMA Negeri 3 MakaleKabupatenTanaToraja South Sulawesi Province because there are still smoker in the school area and teachers in the school meet the desired criteria of this study. This study was conducted for 3 months starting from 20 March to 20 May 2015.

Informant Research

Informants in this study are teachers and students in SMA Negeri 3 Makale, TanaToraja District. The main informants in this study were teachers who were divided into three groups namely the group of teachers who are still smoking, teachers who have stopped smoking, and teachers who never smoked. Sampling method used in this research is snowballing method means that the research-informants obtained in the field based on information obtained from the informants.

Data Collection

In-depth interviews were conducted on informants (teachers) related to knowledge, attitudes, and perceptions about the dangers of cigarettes, as well as their role in the implementation of Non Smoking Area in schools. Focus group discussion, FGD is a data collection technique in qualitative research. Researchers ask and stimulate a number of informants at the same time to discuss to answer the questions posed. FGDs were conducted on students to gain students’ views of the role of teachers as role models in SFA implementation.

Data Analysis

Data analysis in this research is based on case study approach. Data obtained from in-depth interviews, observations, and FGD were processed manually in accordance with the instructions of qualitative data processing and in accordance with the purpose of this study.

Informants in this study were teachers of SMA Negeri 3 Makale as the main informant as many as 9 male teachers divided into three groups:

a. Group of teachers who still smoked as many as four people.

b. Group of teachers who have quit smoking as much as two people.

c. Group of teachers who never smoked as many as three people.

Result and Discussion

Smoking Behaviour Teachers in School

Table 1. Shows Characteristics of Key Informants (Teachers). In addition, this work has also used supporting informants, which are students and the details is shown in Table 2.

Table 1. Characteristics of Key Informants (Teachers)

<table>
<thead>
<tr>
<th>No</th>
<th>Informant</th>
<th>Age</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>IM 1</td>
<td>29</td>
<td>Smoker</td>
</tr>
<tr>
<td>2.</td>
<td>IM 2</td>
<td>36</td>
<td>Smoker</td>
</tr>
<tr>
<td>3.</td>
<td>IM 3</td>
<td>52</td>
<td>Smoker</td>
</tr>
<tr>
<td>4.</td>
<td>IM 4</td>
<td>43</td>
<td>Smoker</td>
</tr>
<tr>
<td>5.</td>
<td>IBM 1</td>
<td>51</td>
<td>Quit Smoking</td>
</tr>
<tr>
<td>6.</td>
<td>IBM 2</td>
<td>32</td>
<td>Quit Smoking</td>
</tr>
<tr>
<td>7.</td>
<td>ITM 1</td>
<td>46</td>
<td>Never Smoked</td>
</tr>
<tr>
<td>8.</td>
<td>ITM 2</td>
<td>46</td>
<td>Never Smoked</td>
</tr>
<tr>
<td>9.</td>
<td>ITM 3</td>
<td>58</td>
<td>Never Smoked</td>
</tr>
</tbody>
</table>
Table 2. Characteristics of Supporting Informants (Students)

<table>
<thead>
<tr>
<th>No</th>
<th>Informant</th>
<th>Age</th>
<th>Smoking Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>RS</td>
<td>15</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>2.</td>
<td>YLFR</td>
<td>16</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>3.</td>
<td>ET</td>
<td>17</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>4.</td>
<td>KG</td>
<td>17</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>5.</td>
<td>LT</td>
<td>17</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>6.</td>
<td>DCB</td>
<td>17</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>7.</td>
<td>ABQ</td>
<td>17</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>8.</td>
<td>YS</td>
<td>17</td>
<td>Never Smokes</td>
</tr>
<tr>
<td>9.</td>
<td>RL</td>
<td>19</td>
<td>Smoker</td>
</tr>
</tbody>
</table>

Based on the results of interviews with ITM3 it can be seen that in SMA Negeri 3 Makale there are still teachers and employees who smoke in the school. According to ITM3, still often see teachers smoking in the classroom. But with the headmaster’s appeal forbidding smoking teachers in the classroom, no more teachers are smoking in the classroom, but they still smoking in teacher’s room and kitchen. In general smokers still smoke in school because they assume that there is no smoking ban for teachers in the school environment as stated by informant IM1.

The interview result shows the teacher does not known the existence of Regent Regulation no. 31 of 2014 and Permendikbud (Minister of Education and Culture) No. 64 of 2015 which regulates the school as one of the non-smoking areas and prohibits teachers from smoking in the school environment. There are also informants who only smoke while in school but do not smoke at home because their wife not allow and they do assume there is no smoking ban at school. In addition, they do realize smoking can have negative impact to child at home.

The interview found that teachers who have quit smoking reluctantly and hard to reprimand teachers who are still smoking if they smoke in school. The principal had admonished the teacher whom smoke and suggested that they look for a safe place so that cigarette smoke will not disturb others. A study conducted by ApaydinKaya⁴ found that smoking behaviour in adolescents is influenced by teacher smoking behaviour in schools. The results of Abdullah¹⁰ study in Denmark emphasized the importance of a smoke-free school environment and concluded that teacher exposure to smoking during school hours affects teenage smoking behaviour.

Knowledge of Cigarettes

In general, the participants know that smoking can lead to disease and health problems such as lung cancer, disruption of the circulatory system, heart disease, foetus disorders, dental and oral diseases and liver cancer.

The participants know that cigarette smoke is very dangerous for passive smokers. The results of this study are in line with Wang¹¹ results in China that most respondents know that smoking is risky to health but only to learn a little about why cigarettes can cause health risks. The results of this study in accordance with the results of research conducted by Maharani and Julianti¹² at the Faculty of Medicine Undip, that the reason informants do not stop smoking are because it is addicted.

Teacher’s Knowledge of Non Smoking Areas and its Application in SMA Negeri 3 Makale

Informants say the goal of Non Smoking Area at school is to reduce the increment of beginner smokers and to sterilize schools from cigarette smoke. In general, informants say that the goal of Non Smoking Area is to improve public comfort and prevent smoking related illness.

The informants have not known any sanctions for teachers who violate. As for students who have violated, smoke or carry cigarettes will be given a sanctions. The result of this research is in line with Wulandari¹³ where, in Pekalongan City that the implementation of Non-Smoking Area has not run maximally since the policy is still in socialization level and the appeal and sanctions are not yet available.

Teacher’s Attitudes toward Smoking Behaviour

The general smoker informants agree that cigarettes can increase self-confidence, can relieve stress, launch thoughts, and as a tool to socialize with people. There are some informants who have quit smoking has realized that cigarettes did not really benefit them. Informants,
who have never smoked think smoking can result in loss of waste and health. The results of this study are in line with the work done by Komasari and Helmi\textsuperscript{14} that smoking is considered to facilitate concentration, gain a pleasant experience, relaxation and reduce tension or stress.

**Teacher’s Attitude to Applying Non Smoking Area Policy in School**

All informants have a positive attitude towards the implementation of Non Smoking Area policy in schools, although for different reasons. The reason for the smoking informant agreed with the Non Smoking Area policy is from an economic point of view. The reason of the informants who had quit smoking was that the Non Smoking Area policy could reduce the number of smokers as well because the informants were aware that cigarette smoke was harmful to others. While the reason informants who never smoked to agree with the Non Smoking Area policy as it can create comfort free from cigarette smoke and can provide an example to the students to not smoke.

**Perceptions of Teachers about the Dangers of Smoking**

In general, informants who have quit smoking and informants never smoked perception that cigarette smoke is also harmful to passive smokers. Passive smokers are at higher risk of smoking from cigarette smoke than active smokers. The results of this study are supported by research conducted by Yang\textsuperscript{15} in China that smoker respondents agree that cigarettes can cause lung cancer and found that 90% of respondents who never smoked and ex-smokers agree if smoking can cause cancer.

**Teacher Perceptions about the Benefits of Non Smoking Area Implementation in Schools**

All good informants who are still smoking, who have quit smoking, or who never smoked believe that the application of Non Smoking Area in school will provide benefits. Implementation of SFA in schools can reduce novice smokers, keep the environment free of cigarette smoke so that health can be maintained, can reduce the number of smokers, prevent students join smoking, and can reduce expenses for smokers.

**Perceptions about Barriers to Non Smoking Area Implementation**

The smokers’ informants perceive that the obstacles of applying Non Smoking Area policies in schools are barriers derived from themselves. These obstacles are the difficulty of eliminating the feeling of wanting to smoke (dependence) as well as the feeling of uncomfortable, upset, and feeling of lack of enthusiasm when they are not smoking. Also, the rule about Non Smoking Area is not clear.

In general, informants perceived that the obstacles faced in the application of Non Smoking Area in schools are still low teacher awareness, low supervision on the implementation of Non Smoking Area, this is related to the limitations of the Non Smoking Area policy itself and the lack of socialization of the rules underlying the application of Non Smoking Area in schools.

**Perceptions about the Factors Driving Non Smoking Area Implementation in Schools**

All informants perceived that the factors that can encourage the implementation of Non Smoking Area is a regulation that must be established by policy makers who set about the form of sanctions clear to those who violate and improve supervision both to teachers and to students. In addition, teachers, employees, and principals should set an example by not smoking. Also need support from all parties, and the need for socialization of existing policies.

The results of this study are in line with Radwan\textsuperscript{16} where, hospitals in Egypt, found that barriers in the application of smoke-free areas are weak tobacco control law enforcement, lack of penalties for offenders, lack of smoking cessation programs for employees and smoking prevalence among doctors is still high.

**Perceptions about Teacher’s Role as a Role Model in Application of Non Smoking Area in School**

Interviews with smokers informants found that they perceived if the task of the teacher is to socialize about cigarettes and danger to the students, but according to his confession this is never done because it is not related to the subjects they teach. In addition there is also a perceived that he does not have the task associated with the implementation of Non Smoking area policy at school.

In general, all informants perceived that the form of teacher behaviour in the application of non-smoking area in schools is vital as the teachers should provide
an example to students by not smoking and adhere to existing rules to become role models for students as well as educate the student regarding the danger of smoking.

**Conclusion**

Based on the study conducted, it is observed that teachers play a huge role in their school. Every student watches and learns from the behaviour of a teacher. Thus, to combat smoking behaviour and implement Non Smoking Area, teachers them self-have to be Role model and then only students will follow. Implementation of non-smoking area policy in SMA Negeri 3 MakaleTanaToraja District needs the cooperation from every personal and the teachers have the significant role in ensuring it.

**Acknowledgment:** The author would like to acknowledge the participants of SMA Negeri 3 MakaleKabupatenTanaToraja and Faculty of Public Health, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


12. Maharani TD, Julianti HP. Smoking Behavior in Male Lecturers in the Faculty of Medicine (Case Study at the Undip Faculty of Medicine) (Doctoral dissertation, Faculty of Medicine). 2011.


Differences in Implementation of Demonstration and Audio-Visual Media Methods on Psychomotor Learning Outcomes among Students for Pregnancy Examination

Ira Jayanti¹, Budu¹, Werna Nontji¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245.
Sulawesi Selatan, Indonesia

Abstract

The study aimed to determine differences in application methods such as demonstration and audio-visual media on psychomotor learning outcomes among students for pregnancy examination. The study was used quasi experiment design. Meanwhile, the sample was selected by systematic random sampling design with pre and post-tests which total sample sizes were 120 samples. The data was collected by using respondent assessment sheet in pregnant women examination. The data had analysed by Kruskal-Wallis and Wilcoxon test with confidence level α= 0.05. The statistical test found the demonstration and audio-visual media methods on psychomotor learning outcomes among students for pregnancy examination had obtained p=0.000. The educators should use appropriate methods in assessing intended learning outcomes and assessment of learning outcomes in term of cognitive and affective.

Keywords: Audio-visual media; Conventional; Demonstration; Pregnant women

Introduction

In general, learning objectives had been classified into three domains included cognitive (knowledge), affective (attitude) and psychomotor (skills). Meanwhile, psychomotor learning was classified as learning new things or modified existing actions. Based on Simpson’s psychomotor domain taxonomy, psychomotor domain had involved physical movement, coordination and motor skill usage. In additions, the psychomotor domain had included action (elementary movement), coordination (synchronized movement), formation (bodily movement) and production (verbal and nonverbal movement).

In this study, psychomotor learning outcomes had been discussed among students in pregnancy examination for professional skill achievements in providing midwifery services. Most of Midwifery Academy in Central Java Province were using demonstration and audio-visual media methods. Yapma Midwifery Academy and Mega Rezky Health Science School (STIkes) in Makassar were offered higher midwifery diploma program. Both institutions had applied demonstration and audio-visual media methods in clinical practice.

The demonstration method had been used in physical pregnancy examination. The demonstration method is helpful for low achieving students with high visual and spatial intelligence but limited in cognitive abilities. Meanwhile, media usage also helped in psychomotor learning improvement among students. Audio-visual media is an information delivery type which contains sound and image elements. The study aims to determine differences in application methods included demonstration and audio-visual media methods in psychomotor learning outcomes among students for pregnancy examination.

Methodology

Study design

The study was using quasi experiment method with pre and post-test control group design.

Study location and time

The study was conducted from July until October 2014 at Yapma Midwifery Academy in Makassar city.
Study population and sample

The study population were students who studied in third semester at Yapma Midwifery Academy and higher diploma in midwifery program in Mega Rezky Health Science School (STIkes) in Makassar.

The sample sizes were 120 respondents by using systematic random sampling.

Data collection

The primary data was collected from a respondent assessment sheet in pregnant women examination. Meanwhile, secondary data was obtained from Yapma Midwifery Academy and Mega Rezky STIkes profile reports in year 2012.

Data analysis

The data had analysed by Kruskal-Wallis and Wilcoxon test with confidence level $\alpha= 0.05$.

Results and Discussion

Univariate analysis

Based on Table 1 and 2, there are differences in number of respondents on psychomotor learning outcomes for pregnant women examination which increased after the study.

The pre-test showed number of respondents increased as 20 respondents and constant as 20 respondents for conventional method. The demonstration method also showed increment for 21 respondents and constant in psychomotor learning outcomes, while number of respondents in audio-visual media method had increased as 20 respondents and 20 respondents in constant for psychomotor learning outcomes. Meanwhile, there are none of constant respondents in post-test I, II.

Table 1. Frequency distribution of respondents based on pre-test and post-test I result

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Increment</th>
<th>Constant</th>
<th>Increment</th>
<th>Constant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstration</td>
<td>21</td>
<td>19</td>
<td>21</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio-visual media</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>59</td>
<td>61</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Frequency distribution of respondents based on post-test II and post-test III result

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Increment</th>
<th>Constant</th>
<th>Increment</th>
<th>Constant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>20</td>
<td>-</td>
<td>20</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstration</td>
<td>21</td>
<td>-</td>
<td>21</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audio-visual media</td>
<td>20</td>
<td>-</td>
<td>20</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>61</td>
<td>0</td>
<td>61</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 3, mean value for conventional, demonstration and audio-visual media are 22.4, 22.8 and 22.9 during pre-test. The standard deviation of three groups during pre-test are 28.0, 31.6 and 27.7. The mean value was observed increase for three groups in post-test I. The mean values for conventional, demonstration and audio-visual media methods during post-test I are 28.0, 31.6 and 27.7. The standard deviation during post-test I for conventional, demonstration and audio-visual media methods are 1.07, 0.49 and 2.55. and III.
Table 3. Mean value and standard deviation of each group on psychomotor learning outcomes among students in pregnancy examination 2014

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test Mean ±SD</th>
<th>Post-test I Mean ±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>22.4±2.68</td>
<td>28.0±1.07</td>
</tr>
<tr>
<td>Demonstration</td>
<td>22.8±2.85</td>
<td>31.6±0.49</td>
</tr>
<tr>
<td>Audio-visual media</td>
<td>22.9±2.51</td>
<td>27.7±2.55</td>
</tr>
<tr>
<td>Total</td>
<td>22.72±2.65</td>
<td>29.1±1.94</td>
</tr>
</tbody>
</table>

The mean value was increased from pre-test until post-test III for conventional, demonstration and audio-visual media methods. The mean value for these three groups during post-test II were 29.5, 37.9 and 32.0. Besides, standard deviation for these three groups during post-test II were 0.51, 0.3 and 0.68. In additions, the mean value for three groups during post-test III were 29.8, 38.0 and 36.1. The standard deviation for conventional, demonstration and audio-visual media methods during post-test III were 0.41, 0.00 and 1.26.

Table 4. Mean value and standard deviation of each group on psychomotor learning outcomes among students in pregnancy examination 2014

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test Mean ±SD</th>
<th>Post-test I Mean ±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>29.5±0.51</td>
<td>29.8±0.41</td>
</tr>
<tr>
<td>Demonstration</td>
<td>37.9±0.3</td>
<td>38.0±0.00</td>
</tr>
<tr>
<td>Audio-visual media</td>
<td>32.0±0.68</td>
<td>36.1±1.26</td>
</tr>
<tr>
<td>Total</td>
<td>33.2±3.6</td>
<td>34.7±3.61</td>
</tr>
</tbody>
</table>

Figure 1 illustrates there are differences in mean values during pre and post-test using conventional, demonstration and audio-visual media methods. The mean value differences occurred in conventional method are pre-test (22.4), post-test I (28.0), post-test II (29.5) and post-test III (29.8). Meanwhile, mean value for demonstration methods at pre-test (22.8), post-test I (31.6), post-test II (37.9) and post-test III (38.0). The mean value for audio-visual media methods at pre-test (22.9), post-test I (27.7), post-test II (32.0) and post-test III (36.1).

Figure 1. Differences in psychomotor learning outcomes among students for pregnancy examination in each group year 2014

Bivariate analysis

Table 5 showed differences in psychomotor learning outcomes on pregnancy examination for pre and post study which p=0.000 <0.05 due to treatment provision through demonstration and audio-visual media methods on physical pregnancy examination.

There are differences between psychomotor learning outcomes on pregnancy examination for pre and post-test with p value = 0.000<0.05. Meanwhile, the differences had observed after post-test III with p value= 0.014. The pregnancy examination applied through conventional method was using assessment sheet lead to skill limitation among students.

Table 5. Differences in psychomotor learning outcomes among students for pregnancy examination year 2014

<table>
<thead>
<tr>
<th>Psychomotor learning outcomes</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Post-test I-pre-test</td>
</tr>
<tr>
<td>Overall</td>
<td>0.000</td>
</tr>
<tr>
<td>Convention</td>
<td>0.000</td>
</tr>
<tr>
<td>Demonstration</td>
<td>0.000</td>
</tr>
<tr>
<td>Audio-visual media</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Meanwhile, there were differences in psychomotor learning outcomes among students for pregnancy examination through demonstration methods until post-test II. In post-test II and III, there was no difference in psychomotor learning outcomes through demonstration methods $p=0.157>0.05$.

There were differences between psychomotor learning outcomes among students on pregnancy examination for pre and post-test with $p$ value $=0.000<0.05$. The psychomotor learning outcome was increased due to this method had been frequently using in the student psychomotor learning.

**Overall Discussion**

In pre-test, 20 respondents who applied conventional methods in psychomotor learning outcomes. The gap increment of psychomotor learning outcomes between pre-test and post-test I caused by conventional methods lead respondents memorized step and activities in pregnancy examination contributed to mistakes repetitive on post-test II and III. Based on the statistical test, there was differences in mean value of psychomotor learning outcomes among students in pregnancy examination for pre and post-test. The conventional learning method is less effective since this method tend to be educator centred method and students were assumed have same knowledge level and their ability to absorb learning material at the same progress$^{10}$. The practice helped in students to have in-depth understanding toward course. The conceptual learning with conventional method also easily became verbalism, visual loss and audible listening which students tend to be passive in the learning lesson.

There were 21 respondents had applied demonstration method in pregnancy examination during pre-test. The statistical test found differences in psychomotor learning outcomes among students for pre-test and post-test I and II, $p=0.000<0.05$, while no differences on psychomotor learning outcomes among students with demonstration methods on mean value of post-test II and III, $p=0.157>0.05$. The benefit of demonstration method is clear teaching materials, more concrete and direct involvement among students. The demonstration method had improved cognitive, effective and psychomotor skill. The demonstration method helped in students’ concentration since this method needed attention and observation during their classes.

Based on statistical test found differences in psychomotor learning outcomes among students for pregnancy examination through audio-visual media method. In additions, 20 respondents had met study objective criteria who applied audio-visual media method in their psychomotor learning during pre-test. The demonstration method involved five senses such as sight, sound, smell, taste and touch, while audio-visual media method only used sight and sound senses. The compact disc digital video (VCD) is among material applied in audio-visual media methods. Several studies found audio-visual media method had enhanced students learning outcomes in many study field$^{11-15}$.

Based on statistical result found there is differences on application of demonstration and audio-visual media method toward psychomotor learning outcomes among students for pre and post-test. The demonstration method provided more impressed in depth of class lesson, thus created good understanding among students. Good demonstration methods helped in getting clear picture of things which related in organization, making process, working process, comparison process and differentiation process. The communication also important since no feedback between educator and learners lead in lower understanding of learners toward material representation, experience and impression.

**Acknowledgement:** The author would like to thank to Yapma Midwifery Academy and Mega Rezky STIkes for resources and data input as well as Faculty of Medicine, Hasanuddin University for unconditionally support.

**Conclusion**

In conclusions, there was differences in demonstration and audio-visual media methods application toward psychomotor learning outcomes among students on pregnancy examination. The demonstration method implementation on pregnancy examination was more effective than audio-visual media and conventional methods application. The educators should use appropriate methods in assessing intended learning outcomes and assessment of learning outcomes in term of cognitive and affective.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil
References


Effect of Iron and Zinc Substance Giving through Fortification Rice on Stress Level of School Age Children in Islamic Boarding School Annihayahkarawang

Ismi Nurwaqiah Ibnu¹, Razak M. Thaha¹, Suriah¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The research aimed at analyzing the effect of iron and zinc substance giving through the fortification rice medium on the students stress level. This was a true experimental research with the Double Blind Randomized Control Trial or DB-RCT. The research result indicates that the fortification rice giving has the effect on the iron deficiency anemia status by increasing the hemoglobin content (MD = 0.36 mg / dl, p = 0.000). The ferritin serum content (MD = -10.3±26.44 μg / dl, p = 0.059), and zinc serum (MD = -21.78 mg / dl, p = 0.000) on the subjects decrease. The fortification rice giving decreases stress score (MD = -10.96, p = 0.000) and decreases stress level better compare with the ordinary rice. There is the correlation of the hemoglobin content escalation (r = 0.637, p = 0.000), the ferritin serum content (r = 0.392, p = 0.026) and the zinc serum content with the stress score of (r = 0.377, p = 0.033) before and after the intervention. The research results are in line with the researches concerning the effect of the fortification rice in several other countries. The further research concerning the relationship between the micronutrient and the stress level on the community population should be better in controlling the other intruding variables and stressors (interaction of inter- micronutrients) which have the potential to influence the result.

Keywords: Anemia; Fortification rice; Stress; Zinc deficiency

Introduction

Improving the health and nutritional status of adolescents is one effort to improve the next generation of the nation. The physical growth of adolescents is the most rapid growth. Adolescents not only grow in size, but also progress in functional, especially the sexual organs or “puberty”. In this period, adolescents need nutritional intake, not only macro nutrients but also micronutrients more to facilitate hormonal activity in regulating the growth and development of adolescents¹.

Several studies in developing countries mentioned the presentation of adolescent anemia by 57%. According to Riskesdas 2013 data, the prevalence of anemia in Indonesia is 21.7%, with the proportion of 20.6% in urban areas and 22.8% in rural areas as well as 18.4% male and 23.9% female. By age group, 5-14 years of 26.4% and 18.4% in the 15-24 year age group². In 2010, the government has set a target of reducing the prevalence of anemia in adolescents by up to 20%.

Cannot be denied, nutritional anemia is indeed one of the health problems in Indonesia is quite difficult to overcome. Significant presentations of adolescents in developing countries are anemic, causing serious consequences in this age group³.

Impact of anemia in children and adolescents, including increased of morbidity, decreased physical performance capacity, and impaired cognitive function. This allows decreased learning capacity and school performance in adolescents with anemia⁴.

Iron is an important component of hemoglobin, myoglobin, and many enzymes in cell metabolism and DNA replication and repair. Iron deficiency is associated with fatigue, poor mood, and an inability to concentrate and remember⁴. Chen⁵ states that iron deficiency anemia increases the risk of mental illness, including mood disorders, autism spectrum disorders, hyperactive disorders and developmental disorders in early children and adolescents. The biggest risk factors are depression...
Zlotkin states that fortifying staple foods tend to increase iron intake for those who consume the most (i.e., adult males). Le suggested in a population of children with mild iron deficiency anemia, iron fortification should be the preferred strategy to combat anemia, according to a study of noodles with iron fortification capable of reducing the prevalence of iron deficiency anemia 5.4%, which amounts to more than 50% of the impact of iron supplements in case of adherence. Food fortification should focus on the fortification of locally consumed ingredients, such as the type of fortification can be implemented on a large scale, allowing people to get more nutritional value from the food they consume eg rice which is the staple food of the Indonesian people.

Thus, this work is aimed at analysing the effect of iron and zinc substance giving through the fortification rice medium on the students stress level at Islamic Boarding School, AnnihayahKarawang.

**Methodology**

**Research Design**

The type of research used was true experiment with the design of Double Blind Randomized Control Trial or DB-RCT, which gives treatment on subjects divided into control groups and fortification rice intervention group, then the effects of intervention were measured and analysed including anemia status, zinc deficiency status and stress level.

**Location and Time of Study**

This research was conducted at Pesantren Annihayah in Karawang Regency because it is the largest rice producer in West Java.

**Population and Sample**

Population in this research is 483 santri. Samples are students aged 12-15 years who go to school and live in boarding Pesantren Annihayah Karawang regency. The Inclusion criteria set for the samples were a. Male gender b. Age 12-15 Years c. Has a concentration of Hb ≥ 8 mg% to ≤12 mg%. d. The sample size is determined based on calculation using formula according to Kasjono’s study. The total sample size for both groups was 80 children.

**Data Collection Method**

Data obtained from primary data and secondary data. Primary data is done by interview using stress scale, laboratory measurement for blood sample whereas Secondary data obtained from Pesantren Annihayah Karawang.

**Intervention Description**

In this study the intervention provided is fortified rice. Fortified rice is processed first into rice and given in the form of consumption as much as 2 times (dinner and breakfast) every day for 6 months. In processing, fortified rice is washed and cooked using prescribed pans and stoves to avoid mixing with other foodstuffs. Feeding process to students is started by weighing and giving each rice 200 grams each meal, then put into the launch box that has been determined. Launch box and then distributed by group. In this feeding, the santri are supervised by their respective group enumerators, and after the meal, the remaining unused rice will be weighed.

**Data Analysis**

Data analysis was done using SPSS program. Bivariate analysis of mean difference test was done to test the difference of Hb level, ferritin level, zinc level and score before and after intervention. The statistical analysis tests included are mean test, independent t-test and bivariate correlation test with Spearman rho.

**Result and Discussion**

**Result of examination of bound variable**

The results of measurement of iron deficiency anemia status, zinc deficiency and stress level of intervention on 160 subjects were divided into four groups (two groups of anemia and two non-anemic groups) is shown in Table 1. The zinc status in this anemia group and non-anemic group are significantly different with p = 0.000 (p < 0.05) and p = 0.027 (p <0.05) respectively. The difference in stress level in this anemia group and non-anemic group are not statistically significant p = 0.262(p > 0.05) and p = 0.491 (p > 0.05) respectively.
Table 1. Distribution of Variable Measurement Results Before Intervention the Granting of Fortification Rice

<table>
<thead>
<tr>
<th>Variable</th>
<th>Anemia Group</th>
<th>Non Anemia Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention I</td>
<td>Control I</td>
</tr>
<tr>
<td></td>
<td>Mean ± SD (n=40)</td>
<td>Mean ± SD (n=40)</td>
</tr>
<tr>
<td>Hb (mg/dl)</td>
<td>11.91 ± 0.73</td>
<td>12.00 ± 0.43</td>
</tr>
<tr>
<td>Ferritin Serum (µg/dl)</td>
<td>38.44 ± 27.56</td>
<td>42.65 ± 34.84</td>
</tr>
<tr>
<td>Zinc Serum (µg/dl)</td>
<td>76.97 ± 11.39</td>
<td>89.10 ± 9.16</td>
</tr>
<tr>
<td>Stress score</td>
<td>156.95 ± 7.64</td>
<td>155.18 ± 6.34</td>
</tr>
</tbody>
</table>

Hypothesis Test Results

Based on Table 2, it is known that the average hemoglobin level in the intervention group I increased by 0.36 mg / dl after obtaining intervention in the form of fortified rice. Changes in hemoglobin levels and the status of anemia in this intervention group after the intervention provision were significantly significant with the p value= 0.000 (p value <0.05). In the non-anemic group, changes in hemoglobin levels of the intervention group given fortified rice increased by 0.39 mg / dl, changes before and after the administration significantly (p = 0.002).

The effect of the intervention on iron deficiency status with an indicator of serum ferritin levels based on Table 2 was found that among all groups, only the intervention group I decreased serum ferritin levels to 28.56 µg / dl after the intervention. But this change is not significantly significant. Likewise, in the non-anemic group, the intervention of fortified rice and ordinary rice increased serum ferritin levels but not significantly, the second intervention group increased serum ferritin levels by 0.22 µg / dl (p = 0.530).

The effect of the intervention on zinc deficiency status with the indicator of serum zinc level based on Table 2, it is known that serum zinc levels of all groups decreased after intervention. The intervention group I decreased the average serum zinc level to 54.46 µg / dl after the intervention, the study subjects in the intervention group I were included in the zinc deficiency category. And this change is significant based on p value = 0.000 (p value <0.05).

The effect of intervention on stress level with stress score indicator based on Table 2, it is known that the average stress score in all groups decreased. In group of anemia, stress score of research subject of intervention group I decreased to146.56 which included low stress levels. Similarly, the non-anemic group given the fortified rice (the intervention group I) decreased the stress score to151.13 (low stress level). Different test analyzes between fortified rice groups and ordinary rice groups were significant at p = 0.003.
Table 2. Influence of Fortification Rice to Status Iron Deficiency Anemia, Zinc and Zinc Deficiency Status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>Before Mean ± SD</th>
<th>After Mean ± SD</th>
<th>Mean Difference</th>
<th>p1</th>
<th>p2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hb (mg/dl)</td>
<td>Intervention I (n =32)</td>
<td>11.85 ±0.60</td>
<td>12.21 ±0.67</td>
<td>0.36 ±0.48</td>
<td>0.000</td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td>Control I (n =32)</td>
<td>11.99 ±0.45</td>
<td>12.61 ±0.82</td>
<td>0.61 ±0.66</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention II (n =30)</td>
<td>12.94 ±0.50</td>
<td>13.33 ±0.83</td>
<td>0.39 ±0.60</td>
<td>0.002</td>
<td>0.157</td>
</tr>
<tr>
<td></td>
<td>Control II (n =30)</td>
<td>12.91 ±0.62</td>
<td>13.11 ±0.99</td>
<td>0.20 ±0.69</td>
<td>0.155</td>
<td></td>
</tr>
<tr>
<td>Ferritim Serum (µg/dl)</td>
<td>Intervention I (n =32)</td>
<td>38.60 ±28.83</td>
<td>28.56 ±18.90</td>
<td>-10.03 ±26.44</td>
<td>0.059</td>
<td>0.186</td>
</tr>
<tr>
<td></td>
<td>Control I (n =32)</td>
<td>38.68 ±32.96</td>
<td>39.39 ±32.80</td>
<td>0.70 ±15.98</td>
<td>0.379</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention II (n =30)</td>
<td>44.28 ±27.22</td>
<td>45.50 ±20.57</td>
<td>0.22 ±21.32</td>
<td>0.530</td>
<td>0.243</td>
</tr>
<tr>
<td></td>
<td>Control II (n =30)</td>
<td>39.82 ±22.62</td>
<td>44.32 ±33.08</td>
<td>4.50 ±22.67</td>
<td>0.829</td>
<td></td>
</tr>
<tr>
<td>Zinc Serum (µg/dl)</td>
<td>Intervention I (n =32)</td>
<td>76.25 ±11.37</td>
<td>54.46 ±6.76</td>
<td>-21.78 ±11.25</td>
<td>0.000</td>
<td>0.024</td>
</tr>
<tr>
<td></td>
<td>Control I (n =32)</td>
<td>89.10 ±9.16</td>
<td>59.06 ±7.81</td>
<td>-29.31 ±9.38</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention II (n =30)</td>
<td>88.50 ±13.79</td>
<td>59.33 ±8.41</td>
<td>-29.16 ±11.18</td>
<td>0.000</td>
<td>0.534</td>
</tr>
<tr>
<td></td>
<td>Control II (n =30)</td>
<td>84.80 ±7.97</td>
<td>60.47 ±9.43</td>
<td>-24.33 ±11.45</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Stress Score</td>
<td>Intervention I (n =32)</td>
<td>157.53 ±7.38</td>
<td>146.56 ±7.67</td>
<td>-10.56 ±12.22</td>
<td>0.003</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control I (n =32)</td>
<td>157.47 ±6.65</td>
<td>152.91 ±8.90</td>
<td>-2.56 ±11.95</td>
<td>0.235</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intervention II (n =30)</td>
<td>156.52 ±6.40</td>
<td>151.13 ±5.03</td>
<td>-5.38 ±6.87</td>
<td>0.599</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control II (n =30)</td>
<td>156.53 ±6.87</td>
<td>152.10 ±8.84</td>
<td>-4.40 ±12.42</td>
<td>0.062</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the correlation study above states that the increase of hemoglobin level before and after intervention in fortification rice group has significant at p = 0.000, closeness of relationship in group the intervention of this fortified rice is higher than that of only ordinary rice of 0.531 or only 28.91% significant at p value = 0.002. At the hemoglobin level, the correlation is positive, meaning that the values of hemoglobin levels move equally, ie between before and after intervention. Compared to stressors, stress scores on the groups given fortified rice intervention were significantly changed before and after significantly significant at p = 0.033. While in the control group I given normal rice, the relationship of stress score before and after intervention of ordinary rice was not significant with the value of p = 0.798. The increase in hemoglobin levels was correlated (correspondingly) with decreased stress score before and after intervention.
Table 3. Relationship Changes Hb Rate with Stress Score before and after Intervention in Groups Anemia

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Group I</th>
<th></th>
<th>Control Group I</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hb (After)</td>
<td>Stress Score (After)</td>
<td>Hb (After)</td>
<td>Stress Score (After)</td>
</tr>
<tr>
<td>Hb (Before), r</td>
<td>0.637**</td>
<td>0.268</td>
<td>0.531**</td>
<td>-0.131</td>
</tr>
<tr>
<td>Sig</td>
<td>0.000</td>
<td>0.138</td>
<td>0.002</td>
<td>0.476</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Stress Score (Before), r</td>
<td>-0.173</td>
<td>-0.377*</td>
<td>-0.079</td>
<td>-0.047</td>
</tr>
<tr>
<td>Sig</td>
<td>0.344</td>
<td>0.033</td>
<td>0.669</td>
<td>0.798</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows the correlation study above states that the increase of ferritin levels before and after the intervention in the group given the fortification rice has significant at p = 0.000, the closeness of ferritin the group given this fortification rice intervention is lower than that of only normal rice which significant at the p value = 0.000. At this ferritin level the correlation is positively signified that the high values of ferritin levels before after the same move are increased between before and after intervention.

In the change of stress score between the fortified rice group and the regular rice, only stress score in the group given the fortification rice intervention that changes before and after significantly significant at p = 0.033. While in the control group I given normal rice, the relationship of stress score before and after intervention of ordinary rice was not significant with the value of p = 0.798. The increase of ferritin content was related (correspondingly) with decreased stress score before and after intervention.

Table 4. Relationship Changes of Serum Ferritin Levels with Stress Scores before and after Intervention on Anemia Group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Group I</th>
<th></th>
<th>Control Group I</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ferritin (After)</td>
<td>Stress Score (After)</td>
<td>Ferritin (After)</td>
<td>Stress Score (After)</td>
</tr>
<tr>
<td>Ferritin (Before), r</td>
<td>0.683**</td>
<td>0.126</td>
<td>0.884**</td>
<td>0.299</td>
</tr>
<tr>
<td>Sig</td>
<td>0.000</td>
<td>0.492</td>
<td>0.000</td>
<td>0.097</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Stress Score (Before), r</td>
<td>0.148</td>
<td>-0.377*</td>
<td>0.037</td>
<td>-0.047</td>
</tr>
<tr>
<td>Sig</td>
<td>0.420</td>
<td>0.033</td>
<td>0.842</td>
<td>0.798</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).
Table 5 shows the correlation study above stated that the increase of serum zinc level before and after intervention in the group given fortification rice has significant at p = 0.026, the correlation of zinc serum in the group given this fortification rice intervention is high compared with that given only ordinary rice which significant at p = value 0.045. In this serum zine the correlation is positive high values of serum zinc levels before intervention with after intervention move equally ie increased between before with after intervention.

In the change of stress score between the fortified rice group and the regular rice, only stress score in the group given the fortification of rice intervention before and after significantly significant at p = 0.033. While in the control group I given normal rice, the relationship of stress score before and after intervention of ordinary rice was not significant with the value of p = 0.798. The increase in serum zinc levels correlates (in line) with a decrease in stress score before and after intervention.

Table 5. Relationship Changes Zinc Serum Levels with Stress Score before and after Intervention in Groups Anemia

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intervention Group I</th>
<th>Control Group I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Zinc Serum (After)</td>
<td>Stress Score (After)</td>
</tr>
<tr>
<td>Zinc Serum (Before), r</td>
<td>0.392*</td>
<td>-0.052</td>
</tr>
<tr>
<td>Sig</td>
<td>0.026</td>
<td>0.779</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Stress Score (Before), r</td>
<td>0.097</td>
<td>-0.377*</td>
</tr>
<tr>
<td>Sig</td>
<td>0.597</td>
<td>0.033</td>
</tr>
<tr>
<td>n</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

Conclusion

Based on the work done, it can be concluded that there was a significant effect of increased hemoglobin levels, decreased serum zinc levels, decreasing stress score in the group given fortified rice and ordinary rice groups. However, there is no effect of stress reduction on ordinary rice group. In addition, there was no significant effect on serum ferritin levels in the group given fortified rice or the usual rice group. There is a relation of decreasing stress score with increasing hemoglobin level, increase of ferritin level insantri before and after fortification of rice. Finally, there is a correlation of decreased stress score with elevated serum zinc levels in santri before and after fortification of rice.

Acknowledgment: The author would like to acknowledge the participants of Pesantren Annihayah Kab. Karawang and Faculty of Public Health, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

5. Nadeak TA, Siagian A, Sudaryati E. Relationship of


Effect of Giving Zinc and Food Supplements to Pregnant Women on Growth, Development, and Child Morbidity Status in Takalar Regency of South Sulawesi in 2016

Jumria¹, Burhanuddin Bahar¹, Arsunan Arsin¹

¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The aim of this work is to determine the effect of giving zinc and food supplement to pregnant women on the status of growth, development and morbidity in children ranging from 13 to 14 years old in Takalar Regency, South Sulawesi Province. The work was an observational study using retrospective cohort design of the subjects in the study done by Taslim in 2004 in order to determine the effect of giving zinc supplement to pregnant women on growth, development and morbidity. Results showed that the group whose mothers were given zinc and food supplement to pregnant women on average have a body length of 48.9 cm and a height of 149.2 cm at this time and the growth of body height for 14 years is 100.3 cm taller than the group with food supplement history and control group with a significant value of p=0.040. For pain occurrence, zinc history group and the giving of zinc and food supplement have a better endurance compared to two groups with only food supplement and control group. In this case, 30 children (68.2%) are not sick but 2 children are sick in other cohort intervention group.

Keywords: body height; menarche; morbidity; zinc supplementation

Introduction

The prevalence of stunting in Indonesia is higher than other countries in Southeast Asia, such as Myanmar (35%), Vietnam (23%), and Thailand (16%). Indonesia is ranked fifth in the world for the number of children with stunting conditions¹. The prevalence of stunting among under-fives in Indonesia is still relatively high compared to the figure in Asia which reached 36.8% with stunting of 19.5% and very short (severe stunting) of 17.3%.

Poor nutritional intake or recurrent infectious diseases may cause short children. In Indonesia more than 36.1% of school-aged children are short-lived when entering school age which is a chronic malnutrition. Children suffering from malnutrition in 2007 were 18.4% and 17.9% in 2010, while stunting in 2007 was 36.8% and 35.6% in 2010².

Zinc is an essential micronutrient and plays a role in various types of enzymes, such as the synthesis and reshuffle of proteins, fats, and carbohydrates. Micronutrients in pregnant women are essential for the development and growth of the foetus in the womb. Zinc which is one of the micronutrients has a function in the immune system and stability of formation³. Thus, if there is zinc deficiency, it can inhibit cell division, tissue growth and repair and eventually cause low birth weight babies (LBW). In addition to zinc also associated with the endocrine system, which supports normal growth, secondary sex characteristic, reproductive function, and thyroid function. Hence, lack of zinc causes not only growth delay but also delayed sexual maturity, hypogonadism, and thyroid dysfunction⁴.

Takalar Regency is the region with the highest prevalence of malnutrition which is 29.78% compared to other area that is Enrekang 17.78% and Maros 11.32%. In South Sulawesi about 44% suffer from extreme malnutrition, 14% malnutrition, and 17.6% with less nutrition⁵.
Based on the results of Basic Health Research (Riskesdas) South Sulawesi Province in 2013 for the prevalence of nutritional status based on TB / U indicators for age 13-18 years in South Sulawesi Province for very short nutritional status of 10.9% and short of 24.8%, while for Takalar regency ie 11.4% for very short and short of 19.0%. The study subjects Taslim (2004) showed that children who were given zinc supplementation and food (group A) had higher stools than zinc supplementation and was given food only. Children who are only given food supplementation (with no zinc supplementation) had a higher rate of height than children who were not given zinc supplementation and food.

Work done by Kusuma showed that the mean rate of weight gain (kg / month) of boys in groups 1, 2 and 3 respectively was 0.181, 0.181 and 0.177. In girls were 0.177, 0.169 and 0.168, respectively. High growth (cm / month) in boys group 1, 2 and 3 respectively were 0.786, 0.786 and 0.773. In girls 0.791, 0.739 and 0.672. Feeding now contributes to weight growth status in 3 groups at a level not significantly different, similar to high growth.

Based on the above background, the authors wanted to continue the study to determine the effect of the history of supplementation zinc + food supplementation for pregnant women (research subjects Taslim on the status of height growth, morbidity, and learning achievement of children at age 12-13 years) in Takalar District, South Sulawesi Province. This study will focus on the effects of zinc and supplementary feeding on pregnant women on high growth status, incidence of morbidity and secondary sex development in children aged 12-13 years.

**Methodology**

**Study Type**

This study was an observational study using a retrospective cohort design (a cohort of subjects studied experimentally by Taslim, which was intended to determine the effect of zinc supplementation to pregnant women (independent variable) with growth, development and morbidity (dependent variable).

**Location and Time**

The study was conducted in North Galesong Sub-District, South Galesong, Pattopakang, Mangarabombang and Patallassang as research sites.

The study was conducted in May 2016.

**Population and Sample**

The population of this study were children aged 12-13 years living in Takalar District, and the samples from this study were children aged 12-13 years living in Takalar District with a history of zinc + food supplementation, history of food supplement pregnancy, and without food and supplements.

**Data Collection**

The data of the research were obtained by collecting primary data and secondary data. The primary data were taken from direct research data in the field before measuring the height of the child (using microtoice), the respondent’s characteristic data (socioeconomic data) and the occurrence of sickness in children that occurred in the range (+ 1 month) and children’s learning achievement (average report score) by using secondary questionnaire.

**Data Analysis**

The collected data was then analysed into bivariate analysis by performing Paired T-Test to determine the mean of the last height of the child during the previous study. This test is conducted to determine the relationship of dependent and independent variables in the form of cross tabulation (crosstab) by using SPSS program with One Way Anova statistical test.

**Result and Discussion**

**Bivariate Analysis**

Table 1 shows the current study subject’s height as well as changes in height calculated from birth (length of birth body). Subjects in the group whose mothers had a history of receiving zinc supplementation and food supplementation while pregnant had a mean of 48.9 cm long birth weight and the current height was 149.2 cm with height growth for 14 years was 100.3 cm. Subjects in the group whose mothers had a history of receiving only food supplementation while pregnant supplementation had a mean birth-length of 49.4 cm and a current height of 147.2 cm with height growth of 14 years was 97.8 cm. While the subjects in the control group had a mean body length of 49.4 cm and a current height of 145.9 cm with a height growth of 14 years was 96.5 cm. Table 2 shows the results of the statistical test
(One Way ANOVA) on the growth rate of height, the value of significance (p value) is 0.046 which means that p value is smaller than α (0.05) it can be concluded that there is very real difference between height growth children given zinc supplementation interventions and food, given food only, and control group). While the rate of growth of body weight, got the value of significance (p value) of 0.308 which means p value smaller than α (0.05) it can be concluded that there is no significant difference between child weight gain given zinc supplementation intervention and food, only given food, and control group.

Table 1. Body Length, Current Body Height, and Higher Body Sample Research

<table>
<thead>
<tr>
<th>Body Height</th>
<th>Zinc + Food</th>
<th>Food</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>SD</td>
<td>mean</td>
</tr>
<tr>
<td>Birth (2002)</td>
<td>48.93</td>
<td>2.12</td>
<td>49.4</td>
</tr>
<tr>
<td>Now(2016)</td>
<td>149.2</td>
<td>5.48</td>
<td>147.2</td>
</tr>
<tr>
<td>Changes</td>
<td>100.3</td>
<td>3.36</td>
<td>97.8</td>
</tr>
</tbody>
</table>

Table 2. The Rate of Increase in Body Height and Sample Weight Research

<table>
<thead>
<tr>
<th>Variable</th>
<th>Zinc + food</th>
<th>Food</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean(SD)</td>
<td>n</td>
</tr>
<tr>
<td>Growth rate of height</td>
<td>44</td>
<td>0.20±0.17</td>
<td>18</td>
</tr>
<tr>
<td>Growth rate of body weight</td>
<td>44</td>
<td>0.10±0.02</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 3 shows the Z-Score comparison based on the type of intervention in the Zinc + PMT group shows the result that the average Z-Score is highest compared to the other two intervention groups, whereby in the male group (0.31) and SD (0.98) and in girls (0.49) and SD (1.27). However, the three intervention groups are at normal values based on the Z-Score standard. Table 4 shows the growth rates of height belonging to the group with a history of zinc + food supplementation with the food group had a mean growth rate with significant values (p = 0.12), whereas for the control group when compared to the history of zinc + food supplementation and history of food average growth rate with significant value (p = 0.014). The average growth rate of children with a history of zinc + food supplementation with food group had high growth rate (p = 0.12) and average growth rate in food and control group (p = 0.64). For the control group and zinc + food group had mean rate of height increase (p = 0.14) and control group and food (p = 0.64).

Table 3. Comparison of Z-Scores by Type of Intervention in Cohort Groups in Sample Research in Takalar Regency, Year 2016

<table>
<thead>
<tr>
<th>Gender</th>
<th>Zinc History + Food</th>
<th>Food History</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean</td>
<td>SD</td>
<td>mean</td>
</tr>
<tr>
<td>Male</td>
<td>0.31</td>
<td>0.98</td>
<td>0.26</td>
</tr>
<tr>
<td>Female</td>
<td>0.49</td>
<td>1.27</td>
<td>-0.18</td>
</tr>
<tr>
<td>Total</td>
<td>0.42</td>
<td>1.15</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Table 4. The Average Rate of Increase in Height between Agencies Based On Type of Intervention Cohort Group on Sample Research in Takalar District, Year 2016

<table>
<thead>
<tr>
<th>Growth Velocity</th>
<th>Group</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body Height</td>
<td>Zinc +Food</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zinc +Food</td>
<td>0.12</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>Food</td>
<td>0.64</td>
</tr>
<tr>
<td>Body Weight</td>
<td>Zinc +Food</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Food</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Zinc +Food</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Food</td>
<td>0.53</td>
</tr>
</tbody>
</table>

Based on the incidence of illness shown in Table 5, the history group Zinc and PMT had good body resistance compared to the two groups with a history of PMT alone and the control group. Namely the number of children who were not sick, 30 children (59.1%) compared with 2 other cohort intervention groups. The types of diseases that have been experienced by children based on the intervention and control group can be seen in Table 6 whereby based on the prevalence rate of current illness in the group with a history of zinc + food supplementation (68.2%) and control group (63.9 %) is not too much different, and it can be seen that the role of zinc supplementation still has a significant effect on the child’s body resistance to infectious diseases, so that the number of children who have many types of infectious diseases in the control group and in the history group of food intervention.

Table 5. Distribution of Children by Patient Intercurrence at Takalar District, Year 2016

<table>
<thead>
<tr>
<th>Illness</th>
<th>Group</th>
<th>History Zinc +Food</th>
<th>Food History</th>
<th>Control</th>
<th>Total</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>18</td>
<td>40.9</td>
<td>7</td>
<td>38.9</td>
<td>7</td>
<td>19.4</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>59.1</td>
<td>11</td>
<td>61.1</td>
<td>29</td>
<td>80.6</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100</td>
<td>18</td>
<td>100</td>
<td>36</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 6. Distribution of Childhood Diseases by Group Intervention in Takalar District, Year 2016

<table>
<thead>
<tr>
<th>Type of Illness</th>
<th>Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>History Zinc +Food</td>
<td>Food History</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>30</td>
<td>68.2</td>
</tr>
<tr>
<td>Fever</td>
<td>8</td>
<td>18.2</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>Influenza</td>
<td>2</td>
<td>4.5</td>
</tr>
<tr>
<td>Tonsils</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>Malaria</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>44</td>
<td>100</td>
</tr>
</tbody>
</table>

Overall Discussion

This study provides information that zinc + PMT supplementation given to pregnant women will improve the supply of macronutrients and micronutrients in pregnant women. In a literature study conducted by Imdad et al. and Rivera et al. who evaluated the effect of zinc on linear growth in children younger than 5 years and adolescents through previous research from various sources it was concluded that there was significant between zinc and the child’s linear growth. Similarly, Palacios et al. suggests that zinc supplements may increase BMI and weight gain.

Based on the results of research conducted by Stammers et al. on the relationship between zinc and the growth of children aged 1-8 years (meta-analysis and literature review study) showed that from nine studies conducted that meet the inclusion criteria, significant of zinc supplements between 2 weeks and 12 months duration in body weight, height for age, weight for age, longevity, weight for height (WHZ) or WHZ score in children aged 1-8 years.

Zinc plays a role in the synthesis of DNA and RNA. In addition, zinc plays an important role in sexual growth and maturation. Although zinc plasma levels decreased during puberty, zinc retention increased significantly during rapid growth rates. This utilization warning might lead to more efficient use of zinc from food. Limited food intake of zinc may affect physical growth and development of secondary sexual characteristics.

Conclusion

Based on the results and analysis of this work, the key findings can be concluded as follow:

1. The height growth rate of children with a history of mother’s zinc + food supplementation and history of food delivery was better than the growth of children with no history of both (maternal groups with a history of food and controls).

2. Sickness events (morbidity) between children with a history of zinc + food supplementation had lower levels of morbidity than the group of children with a history of food and controls.

Acknowledgement: The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

8. Taslim, N. A. The effect of zinc and supplements on pregnant women is less energy on the birth weight and infant nutrition status. 2004.
Female Sex Worker Behaviour against the Risk of HIV and AIDS Transmission in Ambon City

Kalmia¹, H.M. Rusli Ngatimin¹, Muhammad Rachmat¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan, Indonesia

Abstract

HIV and AIDS are two of the health problems that threaten human life in all countries. This study aims to obtain information on the behaviour of female sex workers (WPS) against the risk of HIV and AIDS transmission in Ambon City. This research is qualitative with phenomenology design. The number of informants is 9 people consisting of regular informants and key informants. The obtain information for data collection used in-depth interviews. The results showed that the knowledge of female sex workers on HIV and AIDS can only be transmitted through sex and can be prevented by using condoms during sexual transactions. The workers agree with the usage of condom. However, the usage of condom is not practised by all sexual workers with their customers, especially towards their boyfriends. Only certain workers are consistently using condoms with customers during sexual transactions. Health workers have conducted socialization on HIV and AIDS as well as regular health checks for the sexual workers. Nevertheless, there are some workers who do not follow or conduct the examination. For these sexual workers, it is important for them to earn a lot of money to run their daily lives despite the risk of HIV and AIDS is known.

Keywords: AIDS; HIV; prevention; risk; sexual workers

Introduction

HIV and AIDS can be transmitted through several modes of transmission, such as sexual intercourse of the opposite sex (heterosexual), similar relationships through Male Sex with Men (MSM), the use of syringes alternately, blood transfusions, and from mother to child³,⁴.

Ambon City is the highest in the spread of AIDS cases in Maluku Province, namely 632 people, followed by West Maluku Regency (98 cases), West Seram District (31 cases), East Seram (13 cases) and Buru Island (12 case). In 2010, Maluku occupied the 14th position in Indonesia with 192 cases, the spread of AIDS and 70 people have died⁵.

One of the factors that trigger high HIV and AIDS cases is the knowledge factor⁶. Other research results on the consistency of condom use by sex workers and their customers. Factors that significantly influence the practice of condom use in sex workers and their clients are the knowledge of sex workers on STIs (sexually transmitted infections) and HIV and AIDS, the attitude of sex workers, access to information about STIs and
HIV and AIDS, the ability of customers to engage in safe sex behaviours with the pimp support. Budiono\textsuperscript{7} says this is consistent with Green Theory which states that the most important thing in health behaviour is the issue of behaviour change.

A qualitative study conducted by Jie et al.\textsuperscript{8} on barriers to condom use among female sex workers in China suggested that a major barrier to condom use is related to financial problems. Informants say that some of their clients offer more money even twice as much as not to use condoms during sex. A study by Wulandari et al.\textsuperscript{9} in Jakarta hospital found that knowledge of outpatients on HIV and AIDS is poor even though the HIV and AIDS prevention behaviour is good, and there is no link between HIV and AIDS knowledge with HIV and AIDS risk prevention behaviours. A similar study by Aryani et al.\textsuperscript{10} stated that, low level of education and lack of expertise, makes informants into a woman sex worker. Not all informants are able to reach the existing health services. The ability of informants in reaching health services is different from the ability of informants to reach contraceptives especially condoms. The informants obtained it for free from the health centre and NGOs, both during mobile IMS and extension\textsuperscript{10}.

Based on the stated issues, the female sex worker is one of the groups with the risk of contracting and transmitting HIV and AIDS. Therefore, this work focused on analysing the knowledge, attitudes and actions of the female sex worker against the risk of HIV and AIDS transmission in Ambon city.

**Methodology**

**Research Type**

The research design used is phenomenology design. Phenomenology is a research approach that provides a description of reflection, interpretation and conveys the essence of the life experiences of individuals studied.

**Location and Time**

This research is done at Batu Merah Village, Sirimau Sub-district, Ambon City. The study lasted for approximately one month, from June 9 to July 25, 2016.

**Research Informants**

Informants in this study were women sex workers, local health workers and localization managers of Tanjung Batu Merah Kota Ambon. 9 informants, 7 sex worker women, 1 person manager and 1 health worker were involved in this study.

**Research Instruments**

The researchers used aids such as notebooks, interview guides, questionnaire and documentation tools such as voice recorders and camera phones. Interview was conducted with the informants based on the variables studied.

**Data Collection**

Data collection is done to get as complete information as possible in order to answer the research questions. Data collection effort is done by conducting in-depth interviews with informants.

**Data Analysis**

Processing and presenting data is done by content analysis which is technique used to draw conclusion through effort to determine characteristic of message objectively and systematically. The first thing to do is data reduction. Data presentation is done with narrative text along with its analysis by using facts obtained in the field.

**Result and Discussion**

**Sex worker’s knowledge about the risk of HIV and AIDS transmission**

Based on the answers from the informants, one in seven sex worker informants answered they did not know and never heard about the risk of HIV and AIDS transmission. The informant only consumes antibiotics. The informant assumed the medicine was taken to prevent disease. Other informants who knew about HIV risk answered that HIV and AIDS is a dangerous and deadly disease, and can be prevented by using condoms during sexual transactions. In addition, there are also informants who answered that HIV is a disease similar to syphilis that occurs in the genitals only and HIV can cause death. Thus, to prevent it they must use condom. Another informant replied that HIV is a disease cannot be cured especially if red spots appeared on the skin. Therefore, all informants knew about the risks of HIV and AIDS transmission. Nonetheless, there was one informant who did not know or even heard about HIV and AIDS. Whereas other informants...
know that HIV and AIDS can be transmitted through unsafe sexual relations, and can be prevented by using condoms. Knowledge of informants about the risk of HIV and AIDS transmission of informants is limited since informants think HIV and AIDS can be transmitted only through sexual relations only.

### Attitudes and actions of informants against the risk of HIV transmission

Based on the feedback from the informants, it is known that not all informants who know about the risk of HIV and AIDS transmission ask their customers to use condoms during sexual transactions. One of the informants thought that conducting sexual relations with their customer by using or not using a condom was the same. Another informant responded that they advised to use condoms to their customers to prevent themselves from falling sick. Furthermore, informant also answered that they suggested to the customer to use condoms. However, when it comes to have sexual activity with their boyfriend, they do not recommend using condoms during sexual transactions. Also, another informant replied that she always advised customers to always use condoms because the informant knew the risk of HIV transmission through unsafe sexual intercourse. Informants have also claimed that condoms are available in localization and they also consistently use condoms when transacting sexually with their customers for fear of contracting HIV. Thus, overall informants tend to agree to condom use when transacting sexually but there are some informants do not force their customers and boyfriend to always use condoms and leave the final decision to them.

### Negotiation Capabilities

All informants admitted that the localization provided condoms. Out of seven, there are two informants who remained consistent using condoms for fear of contracting HIV. Other informants claimed to know the risks of HIV transmission will remain for those who use condoms depending on their customers. Another informant replied that condoms are usually available but customers do not like it and there are some customers who offer more pay for not using condoms. A different informant replied that she does not use condoms when it comes to sexual activity with her boyfriend. Nonetheless, if their regular guest still tells them to use condoms to be more secure, they will comply. However, if the informants have suggested to customers to use condoms and the customers still do not want to, then the informant will not force them and will agree with the customer’s request. Another informant stated that she negotiates with the customer by offering that they themselves to wear condoms to customers until the customer agree to use the condom. Overall, all informants claimed condoms were available in the localization, but not all the guests they serve were suggested to use condoms as there were for boyfriend and some customers offered higher pay. There are only a few consistent informants who keep using condoms. Not all who were informants aware of the risks of HIV and AIDS transmission were able to negotiate with the customers regarding condom usage.

### The role of health workers in localization

The role of health workers is to provide understanding and guidance to sex workers on the risk of HIV and AIDS transmission and prevention in the localization. Thus, health education is given to the sexual workers and they are informed to always use condom during sexual transaction. However, there are some sexual workers, if they have been paid more, they no longer force customers to use condoms. In addition, only the senior sexual workers consistently recommend condom usage to customers because they are afraid of falling sick. The younger sexual workers do not force or recommend their customers to use condom, fearing that they will not be able to get money. Finally, only certain sexual workers undergo health examination and the rest do not.

### Overall Discussion

In this prostitution activity, female sex workers provide a significant role in selling sex services. Most informants in this study claimed that their reason for descending into the world of prostitution was an economic reason. This may be due to the fact that most of the informants have high school education, some even dropped out from primary school. Subsequently, to find decent work and get sufficient income for their daily needs and family, they have opted to become sexual workers. This study elevated knowledge as one of the predisposing factors.

Yustina stated that the cause of a person’s behaviour change is due to the reason of thought and feeling in the form of knowledge. Knowledge about
the risk of HIV and transmission will affect informants’ awareness to use condoms to reduce the risk of HIV and AIDS transmission through unprotected sex. This is in line with research conducted by Siswandi which stated that sexual workers know condoms as a tool for prevention of disease.

Efforts to improve the knowledge of women sex workers can be done by means of counselling on a regular basis and educating them on HIV and AIDS transmission in the form of books, magazines, newspapers, brochures, leaflets or other mass media. An attitude according to Yustina is one of the factors driving of a person’s behaviour. In this research, the respondents’ attitude is the tendency of respondents in giving opinions to agree or disagree about the usage of condoms to prevent the risk of HIV and AIDS transmission.

Some informants tend to agree that condom is used to prevent HIV transmission, but do not insist on using condoms on the grounds of their boyfriends. This is in line with research conducted by Aryani et al., which says that sexual workers always invites customers to use condoms but not on boyfriends or people they like. This is because they know their partner well and believe that the partner is healthy. Customers are willing to pay more for not using condoms. Thus, the sexual workers do not use condoms with their customers due to the higher pay and request. This is consistent with research conducted in China by Jie et al. that finance is one of the main reasons sex workers have sex with their customers.

In addition, some informants remain consistent with using condom with their customers during sexual intercourse, as they are afraid of the disease that befell them. This is in line with research conducted by Bui et al. which states that most commercial sex transactions involve workers who actively use condoms, due to fear of illness and pregnancy.

According to Yustina, willingness to offer condoms will be formed if the sexual worker has a positive knowledge of the benefits of condoms usage with customers. The result of this work is coherent with the research conducted by Yustina which stated that only 45.2% do offer and negotiate with their customer to use condom. However, the remaining were not able negotiate with their customers. Many women are helpless when negotiating condom use because they do not have bargaining power. Economic independence is the factor most closely related to bargaining power. The role of health workers is one of the enabling factors. Health workers are expected to provide understanding and guidance on the risks of HIV transmission to direct sex worker women. This guidance can be done through health counselling conducted in the localization.

**Conclusion**

The results showed that the knowledge of female sex workers are limited on HIV and AIDS can only be transmitted through sex and can be prevented by using condoms during sexual transactions. The workers agree with the usage of condom. However, the usage of condom is not practised by all sexual workers with their customers, especially towards their boyfriends. This is because of economic factor, as the worker need money for their daily activity and they are being paid extra for not using condom. Thus, even though the risk of HIV and AIDS is known, the workers opt to neglect it. Only certain workers are consistently using condoms with customers during sexual transactions.

**Acknowledgement:** The authors would like to thank Faculty of Public Health, Hasanuddin University for their support and facilities in conducting this study. The authors would also like to thank Ministry of Higher Education for the support given.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

5. Selvia Utami K, Ibnu IF, Riskiyan S. Behavior of Female Sex Workers (WPS) against prevention HIV and AIDS in the localization of Tanjung Desa Batu Merah, Sirimau District, Ambon City.


Relationship between Supplementary Minnesota Multiphasic Personality Inventory (MMPI) test toward Competency and Intranatal Care Services among Midwifery Students in Tanawali Persada Health Science School, Takalar Regency

Lince Renden¹, Budu¹, Werna Nontji¹

¹Faculty of Medicine, Hasanuddin University, Jl. Perintis Kemerdekaan Km.10, Makassar, 90245. Sulawesi Selatan, Indonesia.

Abstract

The study aims to determine relationship between supplementary Minnesota Multiphasic Personality Inventory (MMPI) test toward competency and intranatal care services among midwifery students in Tanawali Persada Health Science School (STIkes), Takalar regency. The study was used an analytic observational study with cross sectional study design. The study population were midwifery students who had competence test. The sample sizes were 109 respondents by using consecutive sampling method. The result indicted there is a relationship between supplementary MMPI based on ego-strength (Es), p=0.00<0.05, social responsibility (Re) with p= 0.00<0.05, marital distress (MDS) with p=0.01<0.05, addition admission scale (AAS) with p=0.00<0.05, addition potential scale (APS) with p = 0.00<0.05 and masculine gender role (GM) with p =0.00<0.05, post-traumatic stress disorder (PTSD) (PTSD) with p=0.03<0.05. Meanwhile, anxiety (A), repression (R), dominance (DO), over controlled hostility scale (OH), college maladjustment (Mt), hostility scale (Ho), O (O) and feminine gender role (GF) did not have relationship with competence test of midwifery students. Besides, a significant relationship between intranatal service and competence test.

Keywords: Anxiety; Dominance; Intranatal service; Midwifery

Introduction

An estimation of 830 women died from preventable causes related to pregnancy and childbirth¹. Between 1990 and 2005 found 535, 900 maternal mortality occurred in worldwide and sub-Saharan Africa and Asia had recorded 50% and 45% of cases respectively². Several factors contributed to maternal mortality included infection, haemorrhage, obstructed labour and eclampsia, while non- biological factor such as socio-cultural and economic factors³.

Midwives was primary care providers and their care included primary, gynaecologic and family planning, preconception, pregnancy, childbirth and postpartum period and normal newborn during first 28 days of life⁴. In New Zealand, midwives are provided midwifery care through pregnancy, birth delivery, birth and postpartum period up to six weeks for women who had booked midwifery services⁵.

A well-educated midwifery is important in providing health services quality. The midwifery students are required to equip with adequate theoretical and practical experiences for professional skills development in midwifery register included women health during postnatal period, competence assessment, prevention, identification and prompt treatment of genital tract morbidity in United Kingdom⁶.

In Indonesia, competency test is important to ensure capability of health graduates in their professional duties performance especially their perception and basic knowledge level toward their respective health professional. The competency test had 3 domains are cognitive, psychomotor and attitude. In STIkes Tanawali Persada, only 22.0% of 109 midwifery students had passed for competency test in year 2014. Meanwhile, preliminary observation also indicated 80% of midwifery students had unprepared to sit the competency test due to their lack of knowledge in competency test.
process and need support or motivation so that no any pressure in sitting the competency test. The study aims to determine relationship between supplementary Minnesota Multiphasic Personality Inventory (MMPI) test toward competency and intranatal care services among midwifery students in Tanawali Persada Health Science School (STIkes), Takalar regency.

**Methodology**

The study was used analytic observation method with cross sectional study design by using questionnaire. The study was conducted from September to November 2014 at STIkes Tanawali Persada, Takalar regency.

The study population were all midwifery students in STIkes Persada Takalar, Takalar regency. The sample sizes were 109 respondents by using consecutive sampling technique. The primary data was obtained by observation and interview by using questionnaire. The secondary data was obtained through visits at related agencies. The data was analysed using chi-square test to determine relationship between variables.

**Results and Discussion**

**Bivariate Analysis**

Based on Table 1, there is no significant relationship between anxiety and competency test on midwifery students at STIkes Tanawali Persada. There are 17 respondents had score ≥ 65 and 92 respondents had score less than 6. In additions, 2 respondents (11.8%) were passed and 15 respondents (88.2%) had failed in competency test with score more than 65. 22 respondents (23.9%) had passed and 70 respondents (76.1%) had failed in the competency test with score less than 65.

For social responsibility (RE), the statistical test showed no significant relationship between social responsibility (RE) and competency test among midwifery students at STIkes Tanawali Persada. Meanwhile, 63 respondents (78.8%) were failed in the competency test with Mt score less than 65 and 7 respondents (24.1%) were passed in the competency test with Mt score more than 65. There is significant relationship between Mt and competency test, p=0.04<0.05.

Besides, the statistical test found there is significant between marital distress scale (MDS) and competency test. 67 respondents (78.8%) were failed in their competency test with marital distress scale (MDS) less than 65 and 18 respondents (21.2%) were failed in the competency test with MDS score less than 65. There is no significant relationship between hostility (HO) and competency test. 26 respondents (74.3%) were failed in the competency test and only 9 respondents (25.7%) were passed in the competency test with HO score more than 65.

Based on over controlled hostility (OH), the statistical test found there is no significant relationship between OH and competency test, p= 0.19>0.05. Meanwhile, there is significant relationship between MAC and competency test. The addiction admission scale (AAS) had no significant relationship with competency test.

For repression (R), only 2 respondents (13.3%) were failed and 13 respondents (86.7%) were passed in the intranatal care services. There is significant relationship between repression (R) and intranatal service.

For Es, there only 5 respondents (12.5%) who failed in the competency test with Es score more than 65 and 7 respondents (10.1%) were failed in the competency test with Es score less than 65. The statistical result showed there is no significant relationship between Es and intranatal care services. In additions, 20 respondents (80.0%) were passed with DO score more than 65 and 77 respondents (91.7%) were passed with DO score less than 65. The statistical test showed there is significant relationship between DO and intranatal care services.

Besides, there was no significant relationship between GF and post-traumatic stress disorder (PTSD) with intranatal care services. There were 4 respondents (7.4%) who failed in the competency test with GF score more than 65. For post-traumatic stress disorder (PTSD) MMPI scale, 48 respondents (87.3%) were passed and 7 respondents (12.7%) were failed in the competency test with post-traumatic stress disorder (PTSD) less than 65.
Table 1. Relationship between supplementary MMPI test based on A, R, Es, DO, Re, Mt, MDS toward competency test among midwifery students at STikesTanawaliPersada, Takalar district

<table>
<thead>
<tr>
<th>MMPI scale</th>
<th>Competency test</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
<td>Fail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Anxiety (A) score≥65</td>
<td>2</td>
<td>11.8</td>
<td>15</td>
</tr>
<tr>
<td>Anxiety (A) score&lt; 65</td>
<td>22</td>
<td>23.9</td>
<td>70</td>
</tr>
<tr>
<td>Repression (R) score≥65</td>
<td>5</td>
<td>33.3</td>
<td>10</td>
</tr>
<tr>
<td>Repression (R) score&lt; 65</td>
<td>19</td>
<td>20.2</td>
<td>75</td>
</tr>
<tr>
<td>Ego strength (Es) score≥65</td>
<td>9</td>
<td>22.5</td>
<td>31</td>
</tr>
<tr>
<td>Ego strength (Es) score&lt; 65</td>
<td>15</td>
<td>21.7</td>
<td>54</td>
</tr>
<tr>
<td>Dominance (DO) score≥65</td>
<td>7</td>
<td>28.0</td>
<td>18</td>
</tr>
<tr>
<td>Dominance (DO) score&lt; 65</td>
<td>17</td>
<td>20.2</td>
<td>67</td>
</tr>
<tr>
<td>Social responsibility (RE) score≥65</td>
<td>23</td>
<td>22.8</td>
<td>78</td>
</tr>
<tr>
<td>Social responsibility (RE) score&lt; 65</td>
<td>1</td>
<td>12.5</td>
<td>7</td>
</tr>
<tr>
<td>Mt score≥65</td>
<td>7</td>
<td>24.1</td>
<td>22</td>
</tr>
<tr>
<td>Mt score&lt; 65</td>
<td>17</td>
<td>21.2</td>
<td>63</td>
</tr>
<tr>
<td>Marital distress scale (MDS) score≥65</td>
<td>6</td>
<td>25.0</td>
<td>18</td>
</tr>
<tr>
<td>Marital distress scale (MDS) score&lt; 65</td>
<td>18</td>
<td>21.2</td>
<td>67</td>
</tr>
</tbody>
</table>
Table 2. Relationship between supplementary MMPI test based on OH, MAC, AAS, APS, GM, GF and post-traumatic stress disorder (PTSD) toward competency test among midwifery students at STIkesTanawaliPersada, Takalar district

<table>
<thead>
<tr>
<th>MMPI scale</th>
<th>Competency test</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
<td>Fail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Hostility (HO) score≥65</td>
<td>9</td>
<td>25.7</td>
<td>26</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>15</td>
<td>20.3</td>
<td>59</td>
</tr>
<tr>
<td>Overcontrolled hostility (OH)</td>
<td>3</td>
<td>33.3</td>
<td>6</td>
</tr>
<tr>
<td>score≥65</td>
<td>21</td>
<td>21.0</td>
<td>79</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacAndrew alcoholism scale (MAC)</td>
<td>2</td>
<td>20.0</td>
<td>8</td>
</tr>
<tr>
<td>score≥50</td>
<td>22</td>
<td>22.2</td>
<td>77</td>
</tr>
<tr>
<td>score&lt; 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition admission scale (AAS)</td>
<td>3</td>
<td>14.3</td>
<td>18</td>
</tr>
<tr>
<td>score≥65</td>
<td>21</td>
<td>23.9</td>
<td>67</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition potential scale (APS)</td>
<td>1</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>score≥65</td>
<td>23</td>
<td>21.3</td>
<td>85</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masculine gender role (GM)</td>
<td>4</td>
<td>33.3</td>
<td>8</td>
</tr>
<tr>
<td>score≥50</td>
<td>20</td>
<td>20.6</td>
<td>77</td>
</tr>
<tr>
<td>score&lt; 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feminine gender role (GF)</td>
<td>15</td>
<td>27.8</td>
<td>39</td>
</tr>
<tr>
<td>score≥65</td>
<td>9</td>
<td>16.4</td>
<td>46</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-traumatic stress disorder (PTSD)</td>
<td>11</td>
<td>20.4</td>
<td>43</td>
</tr>
<tr>
<td>score≥65</td>
<td>13</td>
<td>23.6</td>
<td>42</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Relationship between supplementary MMPI test based on A, R, Es, DO, Re, Mt and MDS toward intranatal care services among midwifery students at STIkesTanawaliPersada, Takalar district

<table>
<thead>
<tr>
<th>MMPI scale</th>
<th>Intranatal care services</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
<td>Fail</td>
<td>n</td>
</tr>
<tr>
<td>Anxiety (A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>14</td>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>83</td>
<td>9</td>
<td>92</td>
</tr>
<tr>
<td>Repression (R)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>13</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>84</td>
<td>10</td>
<td>94</td>
</tr>
<tr>
<td>Ego strength (Es)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>35</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>62</td>
<td>7</td>
<td>69</td>
</tr>
<tr>
<td>Dominance (DO)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>20</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>77</td>
<td>7</td>
<td>84</td>
</tr>
<tr>
<td>Social responsibility (RE)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>89</td>
<td>12</td>
<td>101</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>8</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Mt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>24</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>73</td>
<td>7</td>
<td>80</td>
</tr>
<tr>
<td>Marital distress scale (MDS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>22</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>75</td>
<td>10</td>
<td>85</td>
</tr>
</tbody>
</table>

Table 4. Relationship between supplementary MMPI test based on OH, MAC, AAS, APS, GM, GF and post-traumatic stress disorder (PTSD) toward intranatal care services among midwifery students at STIkesTanawaliPersada, Takalar district

<table>
<thead>
<tr>
<th>MMPI scale</th>
<th>Intranatal care services</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pass</td>
<td>Fail</td>
<td>n</td>
</tr>
<tr>
<td>Overcontrolled hostility (OH)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>90</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>MacAndrew alcoholism scale (MAC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>score≥50</td>
<td>10</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>score&lt; 50</td>
<td>87</td>
<td>12</td>
<td>99</td>
</tr>
</tbody>
</table>
Table 4. Relationship between supplementary MMPI test based on OH, MAC, AAS, APS, GM, GF and post-traumatic stress disorder (PTSD) toward intranatal care services among midwifery students at STIKesTanawaliPersada, Takalar district

<table>
<thead>
<tr>
<th></th>
<th>score≥65</th>
<th>score&lt; 65</th>
<th>score≥65</th>
<th>score&lt; 65</th>
<th>score≥65</th>
<th>score&lt; 65</th>
<th>score≥65</th>
<th>score&lt; 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addition admission scale (AAS)</td>
<td>19</td>
<td>90.5</td>
<td>2</td>
<td>9.5</td>
<td>21</td>
<td>100.0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>78</td>
<td>88.6</td>
<td>10</td>
<td>11.4</td>
<td>88</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Addition potential scale (APS)</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100.0</td>
<td>0.00</td>
<td></td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>96</td>
<td>88.9</td>
<td>12</td>
<td>11.1</td>
<td>108</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masculine gender role (GM)</td>
<td>11</td>
<td>91.7</td>
<td>1</td>
<td>8.3</td>
<td>12</td>
<td>100.0</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>score≥50</td>
<td>86</td>
<td>88.7</td>
<td>11</td>
<td>11.3</td>
<td>97</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>score&lt; 50</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feminine gender role (GF)</td>
<td>50</td>
<td>92.6</td>
<td>4</td>
<td>7.4</td>
<td>54</td>
<td>100.0</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>score≥65</td>
<td>47</td>
<td>85.5</td>
<td>8</td>
<td>14.5</td>
<td>55</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>score&lt; 65</td>
<td>49</td>
<td>90.7</td>
<td>5</td>
<td>9.3</td>
<td>54</td>
<td>100.0</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>Post-traumatic stress disorder (PTSD)</td>
<td>48</td>
<td>87.3</td>
<td>7</td>
<td>12.7</td>
<td>55</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Multivariate Analysis**

Based on Table 5, only E$\delta$ variable was most related to the competency test with $p = 0.001$. Meanwhile, RE, Mt, MDS and post-traumatic stress disorder (PTSD) showed no significant relationship with the competency test. Meanwhile, APS and AAS had significant relationship with intranatal care services. The APS MMPI scale had statistical value, $p = 0.00 < 0.05$ while AAS MMPI scale had statistical value, $p = 0.02 < 0.05$. 

Cont...
Table 5. Distribution of respondents based on relationship between supplementary MMPI scale test based on Es, RE, Mt, MDS and post-traumatic stress disorder (PTSD) with competency test among midwifery students in STIkes Tanawali Persada, Takalar regency

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Standard coefficient</th>
<th>Sig (value)</th>
<th>df</th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Es</td>
<td>0.019</td>
<td>0.560</td>
<td>0.001</td>
<td>1</td>
<td>0.974</td>
<td>1.019</td>
</tr>
<tr>
<td>RE</td>
<td>0.695</td>
<td>0.710</td>
<td>0.950</td>
<td>1</td>
<td>0.329</td>
<td>2.003</td>
</tr>
<tr>
<td>Mt</td>
<td>0.338</td>
<td>0.610</td>
<td>0.300</td>
<td>1</td>
<td>0.579</td>
<td>1.403</td>
</tr>
<tr>
<td>MDS</td>
<td>0.347</td>
<td>0.590</td>
<td>0.340</td>
<td>1</td>
<td>0.560</td>
<td>1.415</td>
</tr>
<tr>
<td>Post-traumatic stress disorder (PTSD)</td>
<td>0.248</td>
<td>0.550</td>
<td>0.190</td>
<td>1</td>
<td>0.657</td>
<td>0.780</td>
</tr>
</tbody>
</table>

Table 6. Distribution of respondents based on relationship between supplementary MMPI test based on RE, Es, MDS, AAS and APS with intranatal care services among midwifery students in STIkes Tanawali Persada, Takalar regency

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Standard coefficient</th>
<th>Sig (value)</th>
<th>df</th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE</td>
<td>.322</td>
<td>0.83</td>
<td>0.14</td>
<td>1</td>
<td>.699</td>
<td>.724</td>
</tr>
<tr>
<td>Es</td>
<td>.177</td>
<td>0.65</td>
<td>0.07</td>
<td>1</td>
<td>.787</td>
<td>.838</td>
</tr>
<tr>
<td>MDS</td>
<td>.215</td>
<td>0.84</td>
<td>0.06</td>
<td>1</td>
<td>.800</td>
<td>1.240</td>
</tr>
<tr>
<td>AAS</td>
<td>.063</td>
<td>0.40</td>
<td>0.02</td>
<td>1</td>
<td>.876</td>
<td>.939</td>
</tr>
<tr>
<td>APS</td>
<td>17.939</td>
<td>1.83</td>
<td>0.00</td>
<td>1</td>
<td>.999</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Overall Discussion

The study showed no significant relationship between repression toward competency and intranatal care services among midwifery students. The intranatal care services had influenced by student’s learning and practice outcomes during their study.

The study also showed no significant relationship between dominance (DO) toward competency test and intranatal care services among midwifery students in STIkes Tanawali Persada. The high DO scores are commonly among those who had high responsibility and leadership, secure and self-confident. The study by Hedayat et al. found high DO score among male respondents, while dependency (Dy) and DO score did not vary with duration in day treatment among day-treatment clients.

Social responsibility (RE) is defined as sense of duty, self-confident, strong standard, confidence in others, strong sense of justice and ethical concerns. In this study, social responsibility was correlated with midwifery student’s competency test and intranatal care services.

The midwifery students who scored high Mt scale indicated person who are inefficient, hopeless, procrastinate, anxious, nervous and developed somatic symptom when stress. The study found Mt MMPI score had significant relationship with competency test and intranatal care services. The parent marital distress affected children’s emotional and academic achievement. There was significant relationship between marital distress scale (MDS) towards competency test and intranatal care services among midwifery students in STIkes Tanawali Persada.

The statistical test found no significant relationship between hostility (HO) with competency test and intranatal care services among midwifery students in STIkes Tanawali Persada. The midwifery students who scored high HO score indicated person who had higher anxiety, depression, psychosomatic complaint, poor self-concept, attributed hostility to others and not good adjusted psychological.
High score in overcontrolled hostility (OH) scale to be related with violent and aggressive acts. In this study, statistical test found no significant relationship between overcontrolled hostility (OH) with competency test and intranatal care services. In South California, a study found female college students had higher OH scores than male college students.

The study found MacAndrew alcoholism scale (MAC) had significant relationship toward competency test and intranatal care services. High score in MAC also indicated person who are socially extroverted, self-confidents, enjoy competition and risk taking, lack in concentration, aggressive and potentially in substance abuse.

There was significant relationship between addiction acknowledgment scale (AAS) with competency test and intranatal care services. A study found 8.31% of 385 students had higher scores in AAS who access to internet via cell phone or computers and male students had scored higher mean in AAS than female students. Meanwhile, addiction potential scale (APS) did not correlated with competency test and intranatal care services among midwifery students in STIKes Tanawali Persada. This result showed inability students in determined their potential in apply their theory during their practical period.

The chi square test showed significant relationship between intranatal care services and competency test among midwifery students in STIKes Tanawali Persada, Takalar regency. The well prepared and appropriate curriculum contributed in good competence among students to obtain knowledge in the intranatal care services. The intranatal care services quality was observed from several indicators included technical competence dimension which concerned skills, abilities, appearance or performance among health staffs. This dimension was related to the way that health staffs obeyed health service standards included accuracy, compliance and consistency. The unfulfilled technical competence dimension lead to minor deviation and fatal error which reduced health services quality and can caused dangerous to the patients.

Conclusion

In conclusions, there was significant relationship between supplementary MMPI based on ego-strength (Es), social responsibility (Re), marital distress (MDS), addition admission scale (AAS), addition potential scale (APS) and masculine gender role (GM), post-traumatic stress disorder (PTSD) stress disorder. Meanwhile, anxiety (A), repression (R), dominance (DO), over controlled hostility scale (OH), college maladjustment (Mt), hostility scale (HO), O (O) and feminine gender role (GF) did not have relationship with competence test of midwifery students. Besides, a significant relationship between intranatal service and competence test was a factor which closely correlated to the competency test, while APS was factor closely corrected to intranatal service among midwifery students in STIKes Tanawali Persada, Takalar regency.

Acknowledgement: The author would like to thank STIKes Tanawali Persada, Takalar regency for resources and data input as well as Faculty of Medicine, Hasanuddin University for unconditionally support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Knowledge, Awareness and Perception of Malaysian University Students on Regenerative Medicine and Willingness to Accept and Pay for Regenerative Medicine Therapies

Ramachandren K¹, Tan Ess¹, Tan CK¹, Thiagarajah S¹

¹School of Healthy Aging, Medical Aesthetics and Regenerative Medicine, Faculty of Medicine and Health Science, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract

Regenerative Medicine (RM) is an interdisciplinary field with countless potentials and serves as a solution for the growing rate chronic diseases, communicable and non-communicable diseases in developing countries. For the past 23 years, Malaysia has been exploring this field for the boon RM holds. This study aimed to determine the level of knowledge, awareness and perception of Malaysian university students on Regenerative Medicine. A cross sectional, quantitative pilot study was conducted among 390 Malaysian university students above 18-year-old from government and private universities with science background through convenient sampling. Key results showed that Medical and health science students had more awareness and higher knowledge on RM than engineering and physical science students (p<0.001). Significant association between the types of course enrolled and awareness/knowledge on RM observed (p<0.05). There were significant associations between the level of knowledge and the awareness, willingness to accept and pay for RM therapies/courses (p<0.05). Other demographics did not influence their level of knowledge. Significant association seen between WTP and acceptability of Embryonic stem cell research (ESCR) p<0.05. Students with moderate to good level of knowledge have more awareness, more supportive and showed positive perception towards RM.

Keywords: Regenerative medicine; awareness; knowledge; perception

Introduction

Regenerative Medicine (RM) has been evolving gradually in Malaysia for the past 23 years. This is evident from the established centres for Haematopoietic Stem Cell Transplant (HSCT) in a number of government and private hospitals such as Institute of Paediatrics in Hospital Kuala Lumpur in 1994, Subang Jaya Medical Centre in 1994, Hospital University Kebangsaan Malaysia in 1999. Stem cell therapy one of the major component in RM is considered as a great breakthrough in the paradigm of medicine¹,². Exploration of RM holds the key to solve many growing chronic diseases, infectious diseases and other non-communicable diseases in developing countries³.

University Kebangsaan Malaysia has come out with My Derm, an autologous skin product⁴. Tissue-engineered autologous bladder is been used for patients needing cystoplasty⁵. Numerous RM clinical trials going on which have successfully produced successful therapies that have benefited the developed countries⁶-⁸ countries like Japan, Korea and United States the advancement in RM is astounding⁹. There are substantial evidence supporting the benefits of RM in health and wealth of a nation¹⁰. In line to this, Malaysia should explore more in RM and by evaluating the knowledge, awareness and perception among the Malaysian university students will contribute to this exploration. Approximately 3% of the Malaysia’s population are students pursuing tertiary education according to National Education Statistic Ministry of Higher Education 2015. However, lack of awareness among the Malaysian students on the potential of RM therapies this will impact the health management in future. Hence, interest in RM need to
be instilled among Malaysian youngsters. Besides, education being significant in economic growth and national development, it can be an ideal and powerful tool to create awareness and knowledge related to RM among Malaysian tertiary students. As science and technology is expanding in all fields especially in medicine, our students need to be equally aligned with the growth and aware of global development. In order to assist the growth of RM in Malaysia, a pilot study has been conducted to assess the students’ knowledge, awareness and perception in RM.

**Methodology**

Regenerative Medicine (RM) has been evolving gradually in Malaysia for the past 23 years. This is evident from the established centres for Haematopoietic Stem Cell Transplant (HSCT) in a number of government and private hospitals such as Institute of Paediatrics in Hospital Kuala Lumpur.

**Study Design**

This study was designed as a questionnaire based quantitative study. It was calculated that 384 candidates were required to achieve 95% confidence level and confidence interval of 5% based on SPSS. Informed consents were obtained prior to the distribution of questionnaire. The researcher designed the questionnaire by sourcing from indexed journals, books and reports on RM and vetted by subject supervisor and lecturers from Faculty of Medicine Health and Science (FMHS) in UCSI.

**Study Population**

A sample size of 390 respondents from Klang Valley with science background were targeted. Only Malaysian undergraduate and postgraduate students from both private and government universities with age range of 18-55-year-old were recruited. Both gender whom were English literate were accepted for the study. Students from within and outside the premise recruited with the permission of the Deans of the universities.

**Questionnaires**

The self-administered instrumentation tool used in this survey was formulated based on the literature, journals, reference book, report from reliable sources reviewed on various topics related to regenerative medicine’s components including stem cells, tissue engineering and molecular and genetics with their current therapies and future directions of RM\textsuperscript{11-13}. The questionnaire comprises 5 sections: Section A- Demographics- 12 questions, Section B-Awareness on RM-10 questions, Section C- Knowledge on RM -10 questions, Section D- Perception on RM-12 questions and Section E- Willingness to accept, pay and contribute for RM based therapies, courses and research-8 questions. A combination of dichotomized and trichotomized responses, Likert scale were used to collect data from participants.

**Ethical Clearance:** Ethical approval was granted from the UCSI ethical committee (Proj-FMHS-EC-2016-519). Written informed consent was obtained from each recruited respondent.

**Data Analysis**

All data collected via this study was analysed using the Statistical Package for the Social Sciences (SPSS) version 20. Content validity of the questionnaire was done by conducting a pre-test of the instrument in a small group of university students. Descriptive analysis was used to describe the levels of awareness, knowledge, and perception of the participant groups. Comparison between groups according to their answers and socio-demographics characteristics. Significance for all statistical measures was determined at the p value < 0.05 level.

**Result and Discussion**

Knowledge among University Students on Regenerative Medicine

Level of knowledge on RM was determined through participants’ familiarity with the definition of regenerative medicine, the branches of RM, the disciplines that consider RM application as important as shown in Table 1.
Table 1. Analysis on knowledge Questions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Yes n (%)</th>
<th>No n (%)</th>
<th>Not sure n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Types of stem cells (ESC, ASC, iPs)</td>
<td>98 (32.7)</td>
<td>111 (37.0)</td>
<td>91 (30.3)</td>
</tr>
<tr>
<td>Role of adult stem cells in the body</td>
<td>171 (57.0)</td>
<td>59 (19.7)</td>
<td>70 (23.3)</td>
</tr>
<tr>
<td>Formation of iPs</td>
<td>84 (28.0)</td>
<td>117 (39.7)</td>
<td>99 (33.0)</td>
</tr>
<tr>
<td>Potentials of stem cells in myocardial infarction</td>
<td>84 (28.0)</td>
<td>111 (37.0)</td>
<td>105 (35.0)</td>
</tr>
<tr>
<td>Stem cells as a mode of treatment for diabetes and leukaemia</td>
<td>122 (40.7)</td>
<td>44 (14.7)</td>
<td>134 (44.7)</td>
</tr>
<tr>
<td>Collecting umbilical cord blood stem cells is pain-free and has no side effects</td>
<td>133 (44.3)</td>
<td>68 (22.7)</td>
<td>99 (33.0)</td>
</tr>
</tbody>
</table>

Awareness among University Students on Regenerative Medicine

Only 38.3% of respondents have heard of the term ‘Regenerative Medicine’ and 61.7% have not heard of this before. Among the 38.3%, students from health science were (n=66, 38.6%), Engineering and physical science students (n=25, 30.9%) and medical (n=24, 50%). Besides that, (n=88, 44.4%) government university students were more familiar with RM term than private university students (n=27, 26.5%) (p<0.05). This could be because of active involvement of government universities in stem cell research which is evident through higher number of scientific papers published\textsuperscript{14,15}. However, there is limited information available on the knowledge, awareness and perception on stem cells among Malaysian medical students\textsuperscript{16}. Participants in general, obtained this awareness from a variety of source. It is not surprising that majority of the respondents heard of RM through mass media as this is the easiest and fastest route to disseminate information. The public are able to obtain information easily through the media and internet\textsuperscript{17}.

Perception among University Students on Regenerative Medicine

A total of n=229 (76.3%) of respondents agreed to support regenerative medicine, n=66 (22%) were ‘not sure’ whether they would support and only n=5(1.7%) denied to support RM in Malaysia. Total of 70% male and female respondents agreed to support RM in Malaysia. Respondents in the age range of 18-31 years showed better support than middle age group because most of the respondents in this age group are in health-related courses. Based on the data analysis, undergraduate (n=182, 73.1%) and postgraduate (n=47, 92.2%)(p<0.01). Students from government universities, 79.8% and 69.6% private university students supported RM. Higher support received from health-based students (81.3%) than engineering-based students (63.0%) (p<0.01).When the respondents’ perception on the estimated duration needed for RM to grow in Malaysia explored, 65% respondents commented that RM would be successful in 10 years and 26% of them felt the growth would take about 20 years. RM is growing exponentially in Asia-Pacific region especially in India and China\textsuperscript{9}. Moreover, one third respondents chose Government Funding and Support, Research, Regulatory environment, Legislative constraints, Investors and Public awareness as determinant of RM’s success. Public awareness is one of the influencing factors which would influence the growth of any field\textsuperscript{18}.

Willingness to Accept and Pay for Regenerative Medicine Therapies/Seminars

Based Table 2, the study conducted, 62% respondents were willing to accept RM therapies but only 56% were willing to pay for therapies. The remaining 38% respondents who were not willing to accept the therapies also answered that their religion would influence their perception RM. Respondents whose perception on embryonic stem cell research has the influence of religion and who were not sure if the religion would influence have not accepted nor pay for RM therapies (p<0.01). This shows there is strong religious affiliation among the respondents in Malaysia\textsuperscript{19}. Product/ therapy specification and information ‘halal’ would contribute to increase the acceptability among the public especially for Muslim residents. Apart from this, respondents who
felt RM has numerous potentials to improve wellbeing agreed to pay whereas those who did not have confidence on the benefits disagree to pay (p<0.01).

Table 2. Association Between WTA and WTP with Demographic, Knowledge Level and Support

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>WTA RM Therapies</th>
<th>WTP RM therapies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n (%)</td>
<td>No n (%)</td>
</tr>
<tr>
<td>(n=300)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>60 (75.0%)</td>
<td>20 (25.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>126 (57.3%)</td>
<td>94 (42.7%)</td>
</tr>
<tr>
<td>Course category</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical and Health Science</td>
<td>125 (57.1%)</td>
<td>94 (42.9%)</td>
</tr>
<tr>
<td>Engineering and Physical Science</td>
<td>61 (75.3%)</td>
<td>20 (24.7%)</td>
</tr>
<tr>
<td>Monthly household income</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;RM2,000</td>
<td>50 (58.8%)</td>
<td>35 (41.2%)</td>
</tr>
<tr>
<td>RM2,001 to RM5,000</td>
<td>67 (56.8%)</td>
<td>51 (43.2%)</td>
</tr>
<tr>
<td>RM5,001 to RM7,500</td>
<td>29 (65.9%)</td>
<td>15 (34.1%)</td>
</tr>
<tr>
<td>RM7,501 to RM10,000</td>
<td>20 (80.0%)</td>
<td>5 (20.0%)</td>
</tr>
<tr>
<td>&gt;RM10,000</td>
<td>20 (71.4%)</td>
<td>8 (28.6%)</td>
</tr>
<tr>
<td>Level of knowledge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>43 (51.2%)</td>
<td>41 (48.8%)</td>
</tr>
<tr>
<td>Moderate</td>
<td>107 (65.2%)</td>
<td>57 (34.8%)</td>
</tr>
<tr>
<td>Good</td>
<td>36 (69.2%)</td>
<td>16 (30.8%)</td>
</tr>
<tr>
<td>Support for RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>34 (47.9%)</td>
<td>37 (52.1%)</td>
</tr>
<tr>
<td>Yes</td>
<td>152 (66.4%)</td>
<td>77 (33.6%)</td>
</tr>
</tbody>
</table>

Factors associated with Students Level of Knowledge on Regenerative Medicine
Based on this study, there is statistically very significant difference between the knowledge of students from Medical and Health Science with students from Engineering and Physical Science categories on RM components (p<0.05). It is clearly evident that students from Medical and Health Science have better knowledge than the students from the other category. More than 70% of them knew the components better compared to the other group.

Result showed that n=41 female participants have good level of knowledge than male n=11 (p<0.01). As for those who have moderate level of knowledge, the female respondents are more in percentage (58.2%) than male (45.0%). However, there is no significant association between level of knowledge, age range and level of education. (p>0.05) Apart from this, more government university students n=38 have good level of knowledge than private university students n=14 (p<0.01). Medical and Health Science students have higher percentage of moderate to good level of knowledge than Engineering and Physical Science (p<0.01). The existing background on healthcare and life science knowledge could have influence their knowledge level on RM. This is proven among students with life science knowledge whom have better acceptability on genetic testing\(^2\). Students with poor level of knowledge (81.0%) still chose mass media as their main source of information compared to exhibition, education or medical professional. (p<0.01). There is a very significant association between source of information and level of knowledge among the students. Students with moderate to good knowledge have more than one resources on RM.

Factors associated with students awareness on Regenerative Medicine

There is no association between the level of education and the awareness among them as the p-value is 0.09. Association between awareness on the exploitation of ‘stem cell’ words in health products and university students’ demographic factors showed that 85.4% medical students, 74.9% of health sciences students and 48.1% of students from physical science and engineering were aware of the misuse of ‘stem cell’ word in healthcare products. There is a very significant association between this awareness and the categories of courses (p<0.01). More than 66% of undergraduate and post graduate from all 3 categories of courses seemed to be aware of this exploitation (p<0.05). Even though, majority of the students had not heard of regenerative medicine, they were familiar with stem cell related questions. According to\(^4\) study, most of the Malaysian medical students were aware of stem cells and the characteristics but limited awareness noted. Medical students 85.4% (n=41) and 53.2% (n=91) health science students have heard of ill effects of unproven stem cell therapy. Only (30.9%) physical science and engineering students seemed to be aware of this statement. This shows that there is awareness among students across the courses but more awareness is seen in medical and health science students than physical science and engineering students (p<0.01). Students at both level of study and from science background have some awareness on unproven stem cell therapy. Medical and health related students were more aware about potentials of gene therapy than engineering and physical science students (p<0.01). However, there is no association between the level of study and awareness on potential of gene therapy (p>0.05).

Factors Associated with Students’ Perception on Regenerative Medicine

Strong association seen between support received and level of knowledge. Respondents with moderate to good level of knowledge agreed to support than those with poor knowledge. (p<0.01). Students with moderate to good level of knowledge agreed with RM’s potentials and thus became more supportive towards RM. Besides that, any misperception should be carefully handled. Respondents of 40% were neutral about medical tourism leading to misconception because of lack of familiarity about the risks it carries. While 60% of online stem cell clinic use internet as their marketing tool for business\(^3\). The management of public discourse and their misperceptions should be overcome by adequate public education and discussion to see progress in stem cell research\(^20\). There is no significant association among the level of study but medical and health students agreed more than engineering students that television can be the source of exploitation (p<0.01).

Conclusion

This study has yielded positive feedback about RM among students in higher learning. Overall the awareness on RM is low but medical and health science students seemed to have more awareness than engineering and physical science students. Students with moderate to
good level of knowledge have better awareness on RM. Majority were aware of the potentials of stem cells and the risks of unproven therapy compared to potentials of genetic therapy. Significant association has been seen between respondents with moderate to good level knowledge and awareness. Even though there are students with poor knowledge whom were willing to know more about RM, the proportion seemed higher among the students with moderate-good level of knowledge. Students used more than one source of information have moderate to good level of knowledge. Through such knowledge, there was some awareness on RM but inadequate.

Acknowledgment: This work was supported by UCSI University Ethical Committee {Proj-FMHS-EC-2016-519} and the UCSI Trust Fund [UCSI University Trust Graduate Scholarship].

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

Menopausal Symptoms and Menopausal Quality of Life during Transitional Period among Military Wives

Nur H.S.¹, C.K. Tan¹, Normina A.B.¹, M.S. Seghayat¹, F. Amini¹, Thiagarajah S.¹, E.S.S. Tan¹

¹Faculty of Medicine and Health Sciences, UCSI University, No.1, Jalan Menara Gading, UCSI Heights, Cheras, 56000 Kuala Lumpur

Abstract

Menopause is a physiologic phase in women life involving hormonal changes that could lead to severe menopausal symptoms and thereafter affecting one’s quality of life. Moreover, army wives lead stressful lives. In this study, we aimed to determine quality of life among army wives during menopausal transition as well as to investigate possible association between socio-demographics and their quality of life. Seventy-five army wives were recruited. Mean age of menopause reported was 51.7 (± 2.5 SD). Physical domain was the most reported menopausal symptoms followed by psychosocial, sexual and vasomotor. Most army wives reported having lack of energy (78.7%), feeling worn out (77.3%) and decreased in physical energy (76%). Least reported symptom was change in facial hair (25.3%). Menopausal stages were significantly associated with MENQOL domains changes except sexual domain (p<0.05). Army wives in the early perimenopausal stage was most affected in psychological and physical domain. Overall MENQOL scores were associated with household income, spouse’s division and rank (p<0.05). Spouse support is crucial during the menopausal transition. As such, intervention such as awareness, education and counselling can help these army wives to improve their QoL.

Keywords: Menopause; women; hormonal; symptoms; quality

Introduction

Menopause is defined as cessation of menstrual cycle due to decrease secretion of progesterone and estrogen from ovarian¹. The age of menopause is between 45 and 55 years. Menopausal symptoms which are associated with the physiological and hormonal changes include hot flushes, night sweats, mood swings, vaginal dryness and much more. The symptoms broadly divided into vasomotor, physical, psychological and sexual components².

Perimenopause is defined as by World Health Organization as the period of time before the final episode of menstruation³. It extend over 2 to 8 years prior to menopause and 1 year after the last menstruation. During this transition time, women experience different physical, psychological and even social changes that may affect their quality of life in a great degree depend on varities of sociodemographic factors. The cultural, social, economic, religious and educational status might be determinant of impact of these changes in quality of life in perimenopause women.

Besides disturbance due to bothersome menopause symptoms, family environment often influence managing the life during these years resulting in chronic stress in premenopausal women. Military wives have been identified to have a higher level of stress, and depression compare to the nonmilitary wives⁴. There are many studies in association of menopausal symptoms and quality of life in women, but no study had been conducted in this specific population in order to see the degree of menopausal symptoms impacting their life. Thus, this research aimed to determine incidences of menopausal symptoms among the military wives in Malaysia and identifying their impact on the health-related quality of life.

Methodology

Study Design and Subjects and Sample Size

Corresponding author:
M.S. Seghayat
E-mail: marjansadat@ucsiuniversity.edu.my

A cross sectional survey was conducted from November 2015 to March 2017 in an Army Camp situated within vicinity of Kuala Lumpur. Sample were army wives whose husband are serving or had previously served the country. Inclusion criteria were women aged 45 to 85 years old and was experiencing symptoms of menopause. Calculated sample size was 73. Other parameters include 95 percent power at significant level of 5% with assumption of design effect of 2.5.

**Sampling Measurement**

The questionnaire consisted three sections; socio-demographics, history of menstrual cycle and Menopause Specific Quality of Life (MENQOL).

MENQOL was developed and established by and had since been widely used in clinical settings to assess health-related quality of life in the menopausal stage. It is also validated in many populations globally. There are 29 items in the self-administered instrument; vasomotor (3 items), psychosocial (7 items), physical (16 items) and sexual (3 items). Initially, each system is qualitatively evaluated as present or nor present. If the symptom is present, then it is scored from 0 as not bothered to 6 as extremely bothered. Score for MENQOL is the mean total of each domain.

**Ethical Approval**

Permission for conduct of study was granted by the Officer in Command of 712 Pusat Perubatan Angkatan Tentera, Kuala Lumpur. Ethical approval was granted by Faculty of Medicine and Health Sciences, UCSI University via approval code Proj-FMHS-EC-2016-516.

**Statistical Analysis**

Statistical analysis was done using the statistical package for the social sciences software (SPSS Software, Chicago, IL) version 23.0 and statistical significant was deemed at p<0.05.

**Result and Discussion**

**Socio Demographic**

Eighty army wives were approached to participate in this study. Five respondents were rejected due to surgical menopause and history of cancer. Range age of respondents is 45 to 58 years old with median age of 52. Range age for attainment of menarche is 11 to 15 years old with median age of 13. Most respondents received education lower than O-level and were from low income group with 74.7% and 56.0% respectively. Only 22.7% of respondents have husbands who are actively serving. Table 1 shows socio-demographic for this study.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Categories (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 to 49</td>
<td>25</td>
<td>33.3</td>
</tr>
<tr>
<td>50 to 54</td>
<td>30</td>
<td>40.0</td>
</tr>
<tr>
<td>55 to 59</td>
<td>20</td>
<td>26.7</td>
</tr>
<tr>
<td><strong>Ethnic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>62</td>
<td>82.7</td>
</tr>
<tr>
<td>Non-Malay</td>
<td>13</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>62</td>
<td>82.7</td>
</tr>
<tr>
<td>Non-Muslim</td>
<td>13</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>32</td>
<td>42.7</td>
</tr>
<tr>
<td>Non-Working</td>
<td>43</td>
<td>57.3</td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower than O-level</td>
<td>56</td>
<td>74.7</td>
</tr>
<tr>
<td>O-level &amp; above</td>
<td>19</td>
<td>25.3</td>
</tr>
<tr>
<td><strong>Household Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than MYR 3500</td>
<td>42</td>
<td>56.0</td>
</tr>
<tr>
<td>More than MYR 3501</td>
<td>33</td>
<td>44.0</td>
</tr>
<tr>
<td><strong>Spouse</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Army</td>
<td>17</td>
<td>22.7</td>
</tr>
<tr>
<td>Veteran</td>
<td>58</td>
<td>77.3</td>
</tr>
<tr>
<td><strong>Rank</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower rank</td>
<td>51</td>
<td>68.0</td>
</tr>
<tr>
<td>Officer</td>
<td>24</td>
<td>32.0</td>
</tr>
<tr>
<td><strong>Age attained menarche</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>11</td>
<td>3</td>
<td>4.0</td>
</tr>
<tr>
<td>12</td>
<td>25</td>
<td>33.3</td>
</tr>
<tr>
<td>13</td>
<td>27</td>
<td>36.0</td>
</tr>
<tr>
<td>14</td>
<td>10</td>
<td>13.3</td>
</tr>
<tr>
<td>15</td>
<td>8</td>
<td>10.7</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td><strong>Regular menstrual cycle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28</td>
<td>37.3</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postmenopausal</td>
<td>34</td>
<td>45.3</td>
</tr>
<tr>
<td>Late perimenopausal</td>
<td>11</td>
<td>14.7</td>
</tr>
<tr>
<td>Early perimenopausal</td>
<td>2</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Pap smear</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>46</td>
<td>61.3</td>
</tr>
<tr>
<td>No</td>
<td>29</td>
<td>38.7</td>
</tr>
<tr>
<td><strong>Menopausal Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45 to 49</td>
<td>5</td>
<td>15.2</td>
</tr>
<tr>
<td>50 to 54</td>
<td>26</td>
<td>78.8</td>
</tr>
<tr>
<td>55 to 59</td>
<td>2</td>
<td>6.1</td>
</tr>
</tbody>
</table>
Menstrual Specific Quality of Life (MENQOL) and Domain Scores

The most affected MENQOL domain is psychical with median score of and range from 1.00 to 6.94; which three most commonly reported symptoms were lack of energy (78.7%), worn-out (77.3%) and decreased in physical strength (76%). Psychosocial is the second most affected domain with median of 2.43; which more than half reported experiencing memory loss (62.7%), having anxiety (58.7%) and feeling less accomplished (54.7%). Vasomotor and sexual domains were equally affected with median of 2.33. In sexual domain, more than half experienced changes in sexual desire (62.7%). The least reported symptom was changes in facial hair (25.3%). Scores for each menopausal symptom is listed in Table 2.

Table 2. Frequency of menopausal symptoms

<table>
<thead>
<tr>
<th></th>
<th>No Experience</th>
<th>Yes</th>
<th>Median (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Vasomotor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hot flushes</td>
<td>47</td>
<td>62.7</td>
<td>28</td>
</tr>
<tr>
<td>Night sweats</td>
<td>45</td>
<td>60.0</td>
<td>30</td>
</tr>
<tr>
<td>Sweating</td>
<td>39</td>
<td>52.0</td>
<td>36</td>
</tr>
<tr>
<td>Psychosocial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissatisfied with personal life</td>
<td>49</td>
<td>65.3</td>
<td>26</td>
</tr>
<tr>
<td>Feeling anxious or nervous</td>
<td>31</td>
<td>41.3</td>
<td>44</td>
</tr>
<tr>
<td>Experiencing poor memory</td>
<td>28</td>
<td>37.3</td>
<td>47</td>
</tr>
<tr>
<td>Accomplishing less than I used to</td>
<td>34</td>
<td>45.3</td>
<td>41</td>
</tr>
<tr>
<td>Feeling depressed, down or blue</td>
<td>40</td>
<td>53.3</td>
<td>35</td>
</tr>
<tr>
<td>Impatient with other people</td>
<td>47</td>
<td>62.7</td>
<td>28</td>
</tr>
<tr>
<td>Wiling to be alone</td>
<td>43</td>
<td>57.3</td>
<td>32</td>
</tr>
<tr>
<td>Physical</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flatulence (wind) or gas pain</td>
<td>36</td>
<td>48.0</td>
<td>39</td>
</tr>
<tr>
<td>Aching in muscle and joints</td>
<td>20</td>
<td>26.7</td>
<td>55</td>
</tr>
<tr>
<td>Feeling tired or worn out</td>
<td>17</td>
<td>22.7</td>
<td>58</td>
</tr>
<tr>
<td>Difficulty in sleeping</td>
<td>43</td>
<td>57.3</td>
<td>32</td>
</tr>
<tr>
<td>Aches in back of neck or head</td>
<td>28</td>
<td>37.3</td>
<td>47</td>
</tr>
<tr>
<td>Decrease in physical strength</td>
<td>18</td>
<td>24.0</td>
<td>57</td>
</tr>
<tr>
<td>Decrease in stamina</td>
<td>19</td>
<td>25.3</td>
<td>56</td>
</tr>
<tr>
<td>Feeling a lack of energy</td>
<td>16</td>
<td>21.3</td>
<td>59</td>
</tr>
<tr>
<td>Drying skin</td>
<td>29</td>
<td>38.7</td>
<td>46</td>
</tr>
<tr>
<td>Weight gain</td>
<td>41</td>
<td>54.7</td>
<td>34</td>
</tr>
<tr>
<td>Facial hair</td>
<td>56</td>
<td>74.7</td>
<td>19</td>
</tr>
<tr>
<td>Changes in skin</td>
<td>36</td>
<td>48.0</td>
<td>39</td>
</tr>
<tr>
<td>Feeling bloated</td>
<td>41</td>
<td>54.7</td>
<td>34</td>
</tr>
<tr>
<td>Low backache</td>
<td>27</td>
<td>36.0</td>
<td>48</td>
</tr>
<tr>
<td>Infrequent urination</td>
<td>38</td>
<td>50.7</td>
<td>37</td>
</tr>
<tr>
<td>Involuntary urination</td>
<td>46</td>
<td>61.3</td>
<td>29</td>
</tr>
<tr>
<td>Sexual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Desire</td>
<td>28</td>
<td>37.3</td>
<td>47</td>
</tr>
<tr>
<td>Vaginal dryness</td>
<td>37</td>
<td>49.3</td>
<td>38</td>
</tr>
<tr>
<td>Avoiding intimacy</td>
<td>46</td>
<td>61.3</td>
<td>29</td>
</tr>
</tbody>
</table>
Menstrual Specific Quality of Life (MENQOL) and Menstrual Stages

Table 3 demonstrates associations between MENQOL and menstrual stages. Respondents in late perimenopausal stage experienced more vasomotor disorders; median score was 3. Postmenopausal stage was least affected and better quality of life. Vasomotor (p=0.021), psychosocial (p=0.030) and physical domains (p=0.026) were significantly affected by menopausal stages except for the sexual domain (p=0.502).

Table 3. Menstrual Quality of Life at varied menstrual stages

<table>
<thead>
<tr>
<th>Menopausal stage categories</th>
<th>Domains Scoring</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td>Regular cycle</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>Postmenopause</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td>Late Perimenopause</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>Early Perimenopause</td>
<td>2.33</td>
</tr>
<tr>
<td></td>
<td>Psychosocial</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>Postmenopause</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>Late Perimenopause</td>
<td>3.57</td>
</tr>
<tr>
<td></td>
<td>Early Perimenopause</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>Physical</td>
<td>2.44</td>
</tr>
<tr>
<td></td>
<td>Postmenopause</td>
<td>3.41</td>
</tr>
<tr>
<td></td>
<td>Late Perimenopause</td>
<td>4.06</td>
</tr>
<tr>
<td></td>
<td>Early Perimenopause</td>
<td>4.75</td>
</tr>
<tr>
<td></td>
<td>Sexual</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Postmenopause</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td>Late Perimenopause</td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>Early Perimenopause</td>
<td>2.33</td>
</tr>
<tr>
<td></td>
<td>MENQOL</td>
<td>2.20</td>
</tr>
<tr>
<td></td>
<td>Postmenopause</td>
<td>2.82</td>
</tr>
<tr>
<td></td>
<td>Late Perimenopause</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td>Early Perimenopause</td>
<td>3.85</td>
</tr>
</tbody>
</table>

Menstrual Specific Quality of Life (MENQOL) and Menstrual Stages

Age category was strongly associated with vasomotor domain. Women within the age of 50 to 54 years old experienced more vasomotor symptoms compared to women at the age of 45 to 49 and 55 to 59. Psychological and physical domain was associated with spouse division; which median scores were higher among wives whose husbands were actively serving versus veteran. Sexual domain was associated with household income. No associations were reported for MENQOL domains with ethnicity, religion, occupation and education. Overall, MENQOL score was associated with household income, spouse division and rank.

Overall Discussion

Mean of menopausal age in this study is 51.7 (± 2.5 SD). This result is found to be almost similar to a study conducted in Kuching, involving 356 Sarawakians which mean age of menopause was 51.28 ±2.3 years old. However, other studies in Malaysia reported earlier menopausal age. Mean menopausal age reported in Kelantan and Ipoh was 49.4 ± 3.4 and 47.96 ± 2.5 years old respectively. Indonesia also had an earlier menopausal age. Indonesians were reported to experience menopause at 49.98 old respectively.

A larger study involving seven countries in South-East Asia reported median age of menopause at 51.09. This study encompassed Malaysia, Singapore, Taiwan, Philippines, Indonesia, Korea and Hong Kong. The SWAN (Study of Women’s Health Across the Nation) proposed natural age of menopause to be 51.4 years.
Thus, the mean menopause age for army wives in this study are within proposed normal range.

Variation in menopausal age across different countries can be attributed to several intrinsic factors such as body mass index, educational status, physical activity, smoking habit, alcohol consumptions, better self-rated health and reproductive history. Variation in menopausal age across different countries can be attributed to several intrinsic factors such as body mass index, educational status, physical activity, smoking habit, alcohol consumptions, better self-rated health and reproductive history. In this study, physical domain was the most affected domain with majority of army wives experiencing lack of energy (78.8%), tiredness and worn out (77.3%) and decreased physical strength (76%). Similarly, East Malaysians were also more affected in the physical domain with the highest reported symptoms were muscular skeletal discomfort (80.1%); followed by physical and mental exhaustion (67.1%) and sleeping difficulties (52.2%). Meanwhile, highest reported symptoms were tiredness (79.1%), reduced level of concentration (77.5%) and musculoskeletal aches (70.6%) in Kelantan. These findings are different than those commonly reported in western countries; where vasomotor symptoms like hot flushes were more prominent. In Netherland, 85% women reported having vasomotor symptoms; while less than half were reported in this study. Lower incidences vasomotor symptoms were also found in few other studies in Asian countries.

Table 4 compares menopause symptoms in this study with those in other countries within the Asia Pacific region. Generally, physical domain was most affected with complains on musculoskeletal and tiredness. On the contrary, study conducted in Taipei reported difficulty in sleeping as their highest symptom. Incidences of several menopausal symptoms were found to be higher in this study compared to other studies. Frequent urination due to poor bladder control was found to be higher almost two folds compared to Melbourne study.

In this study, early perimenopausal stage experienced impairment in psychosocial and physical domain; while late perimenopausal stage were affected in vasomotor domain. These findings were in agreement with several other studies. In contrary, several studies found that postmenopausal women experienced more sexual symptoms; but such association was not established in this study.

Our results found no association between household income and menopausal quality of life; which better income actually lead to poorer QoL. Most studies reported the opposite and the norm that menopause women with better economic status were less affected. Army wives seemed to be more influenced by their spouse. Women whose spouse had retired or was serving in the lower rank had better QoL. Vice versa, army wives had higher anxiety and were more depressed. Spouse support is crucial during the menopausal transition. An educational program which comprised of management and health of menopausal transition was conducted for spouse was in Iran; such intervention evidenced significantly lower psychological and physical domains.

As for other domain, women at the age of 50 to 54 were significantly affected the vasomotor menopausal symptoms compared to those at the age of 45-49 and 55-60 years old. It could be explained by the fluctuation of estrogen levels and it reaches the peak during the perimenopausal stage. These findings were in agreement with other studies in the country as well as studies conducted among Caucasian and Australians. Vasomotor symptoms can be as high as 75% during the perimenopausal.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Feeling tired or worn out</td>
<td>77.3</td>
<td>79.1</td>
<td>38.8</td>
<td>33.8</td>
<td>43</td>
<td>63</td>
</tr>
<tr>
<td>2</td>
<td>Reduced concentration</td>
<td>-</td>
<td>77.5</td>
<td>45.1</td>
<td>-</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Musculoskeletal aches</td>
<td>73.3</td>
<td>70.6</td>
<td>51.7</td>
<td>37.4</td>
<td>57</td>
<td>71</td>
</tr>
<tr>
<td>4</td>
<td>Backache</td>
<td>64.0</td>
<td>67.7</td>
<td>Included with muscle ache</td>
<td>41.5</td>
<td>32</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Night Sweat</td>
<td>40.0</td>
<td>53.0</td>
<td>8.9</td>
<td>11.8</td>
<td>24</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 4. Comparison of Menopausal Symptoms in this Study and Other Studies in the Asia Pacific Region

<table>
<thead>
<tr>
<th></th>
<th>6 Mood swing/ being impatient</th>
<th>7 Vaginal dryness/discomfort</th>
<th>8 Difficulty sleeping</th>
<th>9 Hot Flushes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37.3</td>
<td>50.7</td>
<td>42.7</td>
<td>37.3</td>
</tr>
<tr>
<td></td>
<td>51.0</td>
<td>45.7</td>
<td>45.1</td>
<td>44.8</td>
</tr>
<tr>
<td></td>
<td>22.4</td>
<td>20.7</td>
<td>23.4</td>
<td>17.6</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>24.2</td>
<td>57.4</td>
<td>16.4</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>32</td>
<td>45</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>8</td>
<td>52</td>
<td>33</td>
</tr>
</tbody>
</table>

Conclusion

Results showed decreased QoL particularly in physical and psychosocial domains. It was associated with spouse division. Army wives of actively serving spouse were most affected. Therefore, it is necessary to develop effective intervention program such as awareness, education and counselling for these army wives.

Acknowledgment: The research team are grateful for support of medical committee in Pusat Perubatan Angkatan Tentera Sungai Besi, Kuala Lumpur, Malaysia

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

Tuberculosis: A Complication after Hematopoietic Stem Cell Therapy (HSCT) and Bone Marrow Transplant

Rafidah Binti Baharudin¹, Marjan Sadat Seghayat¹, Farahnaz Amini¹
¹Faculty of Medicine and Health Sciences, UCSI University, No.1, Jalan Menara Gading, UCSI Heights, Cheras, 56000 Kuala Lumpur.

Abstract

Tuberculosis (TB) is the most common mortality cause among infectious diseases in Malaysia, and is one of the oldest known disease in the world. Generally, TB is uncommon among recipients of Hematopoietic Stem Cell Therapy (HSCT) and Bone Marrow Transplant (BMT); however its infection can be highly fatal if detected late. The objective of the literature review is to identify risk factors and common presentations of Tuberculosis infection (TI) among recipients of HSCT and BMT. Literature searched was done by using different keywords from MeSH in PubMed and Google Scholar. Eligible studies that published from 2005 till 2018 in English language that investigated occurrence of Tuberculosis infection (TI) among HSCT and BMT recipients, have been included. They were appraised and analyzed based on the research questions. All recipients of HSCT reported in 15 studies that developed TI had been exposed to cytotoxic drugs/immunosuppressive drugs. Apart from being immunosuppressed due to the disease and cytotoxicity of drugs, 42% of the recipients had history of exposure to TB prior to therapy; 66.6% of them are treated for Leukemia and 67% of the infections occurred in the lungs; according to the case reports findings. Whether or not TI has certain predilection by donor factor, it is noted in the According to the one of case studies, 7/12 (58%) of TI occurred in HSCT with cell source of allo-related donors. It is noted that tuberculosis in recipients of HSCT presented in the common site of infection i.e. lungs. History of TB exposure has significant contribution to the post HSCT complication of TI. The time from HSCT to diagnosis of tuberculosis (TB) infection ranged from 8 days to 270 days post transplantation. Screening program for Latent Tuberculosis Infection (LTBI) prior to therapy / transplant was not done in most instances.

Keywords: Tuberculosis; Stem cell; therapy; HCST

Introduction

Tuberculosis (TB) is caused by Mycobacterium Tuberculosis. It is an opportunistic agent that is transmitted via air. Often, once transmitted to another person, it remained dormant due to the existing immunity that ‘gated’ them from flourishing; in a healthy subject. At this stage, it is called as ‘latent tuberculosis infection’. Repetitive exposure or poor immune response can lead to active TB disease. It is reported that TB killed 1.5 million of the world’s population in 2014¹. Early case detection and prompt treatment is crucial for controlling TB. Common approved treatment regimen for TB is six months. Due to the long duration, issue such as compliance and treatment interruption due to shortage of supply is identified obstacles in controlling TB. According to Roy et al², chance of having active TB in recipient of Hematopoietic Stem Cell Therapy (HSCT) is 2 times more compared to the general population.

Hematopoietic stem cell is known to cure many types of malignant hematologic and non-malignant hematologic diseases, immunodeficiency diseases and in born error metabolism. Autologous HSCT on the other hand is famous for rescuing bone marrow aplasia secondary to multiple myeloma or high dose chemotherapy for solid tumors¹. HSCT is not just known as the treatment paradigm for blood and bone marrow cancers, it started to gain traction as a treatment for
multiple sclerosis. Tuberculosis Infection (TI) is an uncommon complication in HSCT or BMT recipients. However, its fatality is reported to be 50%. TB may result from Latent TB Infection (LTBI) in either the recipient or the donor or post-transplant infection. There is not sufficient data available to calculate the prevalence of TB in this group to recommend any pre-procedure preventive management prior HSCT and BMT. This review will gather as much information, case reports and analysis done previously and identify frequency of TI and its risk factors in order to suggest few preventive measures that may be considered in the future HSCT and BMT clinical guideline.

**Methodology**

**Research Design**

Literature search was done on electronic articles in PubMed and Google Scholar using MesH terms: STEM CELL, HEMATOPOIETIC STEM CELL, BONE MARROW TRANSPLANT and TUBERCULOSIS. Studies included in the review were chosen according to the following criteria: Published papers from 2005 - 2018, in English case reports, prospective studies, and retrospective studies maximize the data available for the structured review.

Studies were selected according to PICO (Patients, Intervention, Comparison and outcomes) and appraised by Jadad Score and Newcastle-Ottawa assessment tools. Studies with score 2 and above by Jadad - Score and 5 and above by Newcastle Ottawa were considered to have high quality.

Subjects in this study were recipients of HSCT or BMT. Risk factors such as age, illness, concurrent treatment (Chemotherapy, Steroid, Cytotoxic drugs etc.), duration of follow up, possible pre and post HSCT/BMT exposure to TB as well as comorbid factors such as diabetes mellitus, chronic obstructive pulmonary disease, other history of autoimmune diseases have been analyzed. Findings will be tabulated for comparison.

**Result and Discussion**

Total of fifteen (15) studies were selected. Eight studies are case reports (i.e. G Martín-Sánchez et al; Ostendorf et al; Lee et al; E Brial et al; RL Russoet al; Tomaszewska et al; Shima et al; and SC KU et al) and seven are retrospective studies (Fan et al; Jung et al; Ullah et al; Safdar et al; Al-Anazi et al; Hyo-Jin Lee et al; Agarwal et al). Out of fifteen studies, one study (1) Bone Marrow was the source of transplanted cells, while the rest obtained HSCT via other sources (Induced by GSF or Cord Blood).

**Findings from Retrospective Studies**

Safdar et al did a retrospective study on Cord Blood Transplantations (CBT) of 97 patients and categorized them accordingly. This study explored the consecutive infection occurred in 97 recipients of CBT. The sources of cord blood were taken from cord blood banks in the United States and Europe. This study looked into spectrum of infection and surveillance was conducted twice weekly during hospitalization, and weekly within 100 days of discharge. It particularly tested for CMV infection, which is more common than TB.

Active Tuberculosis infection is uncommon among cancer patients in the United States. Higher frequency of TI post HSCT occurs in high endemic country such as India - 2%, Hong Kong - 5.5% and Turkey - 1.4%.

Another retrospective study done for a period of 12 years was conducted in Riyadh Armed Forces Hospital by Al-Anazi et al in which records of patients receiving HSCT for treatment of benign and malignant hematological disorders that developed Tuberculosis infection were scrutinized. Eighteen (18) patients were reported to develop tuberculosis infection (TI). Male to female ratio of 2:1, median age of 48.5 (range 19 – 75) and acute myeloid leukemia (4/18) is the most dominant hematological disorder recorded, among the recipient of HSCT in the hospital.

Exposure to cytotoxic drugs seemed to be the major factor of causing TB infection post HSCT, in view of immunosuppressive property which renders anyone to be susceptible to any opportunistic agents like TB, particularly rampant in high endemic countries. Not just rendering a person to be immunosuppressed, it can even alterate the clinical picture of TBI in recipients of HSCT. Clinical manifestation of TB was reported as wide spectrum from being completely atypical to common presentation of TB. It can involve uncommon site such as skin, bone, central nervous system, urinary tract and most fatally, it can be disseminated and cause multi organ failures and septic shock.
Fan et al\textsuperscript{13} estimated that the annual TB incidence among HSCT recipients was 10 times greater than the general population. Median time to post-HSCT TB diagnosis is 1.22 years with 89.7\% of patients were diagnosed beyond 100 days. Asthma and COPD each are common comorbid diseases occurred in HSCT with TI, whilst 69.2\% of recipients with TI had GvHD\textsuperscript{21-23}.

Two studies (Ullah et al\textsuperscript{15} and Fan et al\textsuperscript{13}) reported its TB incidence of 2.3\% and 3.52\%, respectively. Al-Anazi et al\textsuperscript{17} is focusing on eighteen TI occurred in HSCT recipients only. Safdar et al\textsuperscript{16} reported only one case of TI (\textit{Mycobacterium Tuberculosis}) in 100 HSCT recipients while Ullah et al (2007) reported four cases of TI. It is noted that TI occurred commonly in Lungs by all seven studies and majority of HSCT recipients were treated for Leukemia. TI occurred in various age group with the youngest median age of 14 years and the oldest as 85 years. Two studies (Al-Anazi et al\textsuperscript{17} and Ullah et al\textsuperscript{15}) did not mention period of TI occurrence. However Safdar et al\textsuperscript{16} reported TI after 63 days of HSCT and this is farther in Hyo Jin Lee et al\textsuperscript{18}, where TI occurred 386 days post HSCT.

**Findings from Case Report**

Patients represented in eight (8) case reports are categorized by age (0 – 18 children; above 18 adult), gender, nationality and underlying disease to identify possible risk factors of TB infection post HSCT/BMT. Incidence of TB post HSCT reported different base to the countries. TB infection post HSCT is reported to be proportional to the country’s general population\textsuperscript{2,23}.

It is noted that most of recipients i.e. eight (8) out of twelve (12) patients were treated for Leukemia (66.6\%). Two (2) persons received HSCT for treating Severe Aplastic Anemia (16.7\%) while the other two (2) were treated for multiple myeloma and Beta thalassemia major (16.7\%).This may perhaps depicted that HSCT is very effective in treating Leukemia more than other diseases pertaining to blood; or that Leukemia is treatable with HSCT apart from medical intervention such as chemotherapy. Male seemed to be more susceptible to post therapy infection as compared to female as shown on the table i.e. 66.6\% of TB complications are among male recipients. From the twelve (12) recipients, seven (7) were adults (58\%). This may be due to greater number of diseases requiring HSCT in adult as compared to children\textsuperscript{23-25}.

It is important to explore the history of TB exposure pre and post transplant. From twelve (12) recipient, five (5) had given positive TB exposure (42\%). Two of them as reported by E Brial et al\textsuperscript{9} and SC Ku et al\textsuperscript{12}, had history of Latent TB infection or LTBI. One patient had no clinical evidence of LTBI and diagnosed by Tuberculin Skin Test and Interferon Gamma Release Assay test. E Brial et al\textsuperscript{9} studied, impact of high rate of exposure to TB pertaining to country of origin and possibility of LTBI in recipients. Three (3) recipients had history of contact with patients infected by TB. RL Russo et al\textsuperscript{5} reported the recipient had been exposed to TB a year before therapy, while Lee et al\textsuperscript{8} case was exposed to TB four months after transplant, during inpatient care, and lastly Ostendorf et al\textsuperscript{7} reported the patient whom had contact with his TB infected classmate about a decade prior to HSCT.

All 12 patients received conditioning regimen prior to transplant, which mainly consist of cyclophosphamide and busulfan, beside some of them received total body irradiation (TBI). Patients then had been given GVHD prophylactic treatment that made their body even more immunosuppressed. Six patients recorded to have other infection prior to or concurrent with TI, which 4 of them received allo-unrelated HSCT. All 12 patients had allogeneic transplantation that 7 cases were related (58.3\%).

**Site of Post Transplant Tb Infection**

Tuberculosis infection often involves the lung and its parenchyma. Eight out of 12 infection occurred in the lungs (67\%). The most cases shared common clinical manifestation of TB pulmonary symptoms i.e. cough, fever, night sweats, dyspnea and pleuritic chest pain. Although atypical clinical manifestations of tuberculosis infection and localization could be expected considering confounding factors such as prophylactic, cytotoxic and conditioning regime patients received prior to transplant\textsuperscript{25-30}.

Four cases, had extra pulmonary localization for example disseminated TB in 2 cases of Ostendorf et al\textsuperscript{7} and Shima et al\textsuperscript{11} studies, TB of skin, knee and bone -1 case in Tomaszewska et al\textsuperscript{10}. Study and TB of
lymph node in 1 case in SC Ku et al. study. All cases were treated for acute myeloid leukemia but recipient of TB of lymph node, whom had been treated for Beta thalassemia major.

**Conclusion**

Base to this review in majority of cases TI occurred in the lungs (67% of reported by case reports). This explained that incidence of TI in recipients of HSCT represented the common site of infection as per global population, regardless of nationality. Most TI occurred during Intermediate post-transplant (3 weeks to 3 months). Time of occurrence is important so as to plan ahead on screening and to put an alert on healthcare worker of possible common clinical manifestation that indicates TI. Tuberculosis should be detected and treated as early as possible to avoid dissemination and further difficulties in disease control. Most of the studies, lack environmental evaluation and elaboration on TB exposure were not given much emphasis. Screening for TB pre HSCT / BMT is not made mandatory; hence majority did not do so. Future studies should be more concerned on finding the possible source of TI i.e. previous history of TB exposure and/or nosocomial.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Public Perspective and Engagement in Cognitive-Stimulation Activity to Preserve Cognitive Reserve among Seniors in Malaysia - A Pilot Study

Melisa A.S., Normina A.B., E.S.S. Tan, M.S. Seghayat

Abstract

The loss of cognitive capability is a serious problem affecting the elderly population globally. This study aimed to determine different perspectives on cognitive stimulating activity and the engagement in different types of cognitive stimulating activity in order to preserving cognitive reserve among the elderly in Malaysia. CRI questionnaire and IQCODE had been used to assess the level of cognitive reserve in a lifetime and cognitive decline in the elderly, respectively. Data analysis was done using the SPSS 18.0 version, t-test analysis and Pearson’s correlation. Result showed that, the group aged between 61 and 65 also exhibited higher CRI education (F=6.41, p<0.05), CRI leisure time (F=25.72, p<0.01) and CRI working activity (F=43.61, p<0.01) than the other two groups. Participants aged up to 60 years had higher CRI score (M=109.49, SD=15.20) than those aged up to 65 years (M=99.35, SD=11.45) as well as those aged up to 70 years (M=90.51, SD=16.13). All the post-hoc comparisons were significant at 0.05 level, where F=34.7 and p<0.001. In conclusion, results revealed that the adults who participate in brain stimulation activities such as reading magazines and exercise have reduced chances of developing cognitive related conditions. Elderly people who were found to have worked on the professional and intellectual jobs have low chances of developing cognitive problems than those in unskilled manual jobs.

Keywords: Elderly; population; cognitive simulation; CRI

Introduction

The elderly population has grown significantly due to the rise of life expectancy, and therefore cognitive decline has become a key issue faced by the healthcare system. Age is one of the most important factors that affect the cognitive capacity of the individuals and all human beings record a decline in cognitive capacity as time progresses. Nevertheless, a significant number of elderly individuals do not develop major cognitive impairment such as dementia, even though they show the presence of brain lesions, leading to the model of cognitive reserve.

Cognitive reserve (CR) is an important factor in cognitive health of elderly individuals, according to this hypothesis people presents different level of flexibility and adaptability of brain networks, therefore respond and presentation of age related brain changes are different among elders.

In order to improve the quality of life and preserve cognitive reserve among the elderly, several interventions have been proposed. These activities that are known as cognitive stimulation for adults with different mental conditions, offer a range of activities that provide general enhancement of thinking and concentration. Older adults can benefit from various activities that focus on particular cognitive skills, for instance, memory training can yield significant memory performance. Evidence shows that the elderly can learn new things and that cognitively older people are more likely to preserve their cognitive abilities than the inactive ones.

Taking care of patients with dementia and other degenerative brain diseases has enormous consequences...
for their families in terms of their social lives and finances.

Although the cognitive stimulation intervention and its contribution in preservation of cognitive reserve for the elderly is widely discussed in the literature, little has been done to show the public perception and their engagement in this process. In this study we investigated the public perceptions and engagement in cognitive stimulation to preserve the cognitive reserve among the elderly in Malaysia. Engagement in cognitively stimulating activities to preserve cognitive reserve among the elderly in Malaysia is significant because the country has a growing population of individuals aged 60 years and above. Currently, Malaysia’s population above the age of 60 is close to 10% and is estimated to reach 15% in 2035.

According to a report by the Alzheimer’s disease International report, the occurrence of dementia in the country in the year 2005 was 0.063% with an annual incidence rate of 0.020% in the same year. This figure is projected to increase to a prevalence of 0.126% in 2020 and 0.454% in 2050. With its morbidity and rapid growth, dementia ranks second on the burden of ailments in the Asia Pacific region compared to peptic ulcer, breast cancer, malaria and sexually transmitted diseases excluding HIV/AIDS.

Methodology

Study design and sample

This study is a cross sectional questionnaire pilot study on public perspectives & engagement in cognitive-stimulation activity to preserve cognitive reserve among elderly in Malaysia. The inclusion criteria for this study were: (i) Males and females between ages 55 and 70, (ii) Respondent who did not exhibit any symptom of cognitive disability, (iii) English literate and (iv) Consented for study. The exclusion criteria for this study was (i) Clinically diagnosed cognitive disability disorders (ii) Did not consent for study. Prevalence of dementia among Malaysians is unknown. As such, this study is carried out as a pilot study involving 150 respondents.

Ethical approval: Protocol for this study was submitted to UCSI University, Faculty of Medicine and Health Sciences, Ethics Committee and was approved via code Proj-FMHS-EC-2015-518. This research was carried out in accordance to principles outlines in the Declaration of Helsinki.

Data collection

Subjects were recruited, according to inclusion and exclusion criteria and questionnaire survey had been conducted following explanation on the study and informed consent taking. The questionnaire used in the study was divided into several parts as follows: (i) Social demographic questionnaire, (ii) Cognitive Reserve Index questionnaire (CRIq), (iii) The Informant Questionnaire on Cognitive Decline in the Elderly (IQCODE), (iv) Perspective on cognitive stimulation activity to maintain cognitive function, (v) Engagement in cognitive stimulation activity to maintain cognitive function.

Data analysis

The analysis of data was done using the statistical package for social sciences. The data was analyzed using statistical test SPSS 18.0 (Statistical Package for Social Studies) Descriptive analysis, t-test, Pearson’s Correlation analysis. The t-test analysis was used mainly in the comparison of data sets and was efficient because of the small sample that was used in the study. The level of significance set at p<0.05 and confidence interval, CI=95%.

Result and Discussion

Cognitive Reserve Index Questionnaire (CRIQ)

For CRI Education, results on this area showed that 7 (11%) of the total 66 (44%) respondents reported had spent nine years up to the higher education. Also, 16% and 10% of the total respondents with higher education had spent 3 years and 4 years respectively in school. The rest (7%) had spent six years in school, including higher level education. A total of 104 (69%) respondents had educational training that would help them to secure an employment, which can help them attain cognitive reserve.

For CRI working activity, results on CRI working activity was recorded according to skills of the respondents as skills in manual work, skills in non-manual work, professional occupation and intellectual occupation. Most of the participants (33%) had professional occupation such as teacher, doctor and
qualified freelance professional. This group was followed by skilled manual workers with a frequency of 48 (32%), working in different jobs such as tailoring, hairdressing and cooking. The other group with a significant representation was the skilled non-manual workers with a frequency of 19 (13%). Additionally, those with the low skills such as gardeners and waiters as well as those with intellectual occupation such as university professor, judge and senior managers had the lowest frequency of 17, which is 11% of the total sampled population.

For CRI leisure time, result attained showed that on the monthly basis, gardening, DIY and small-scale operations such as knitting were the most frequently practiced activities (67%), followed by social activities such as associations and recreational clubs (57%) and looking after grandchildren or elderly parents (56%). The least reported activities were artistic activities such as music, painting and writing (68%), followed by cinema/theatre and voluntary with about 65% and 62% of the total sample respectively.

The other frequency was on the annual basis and recorded three main activities; exhibitions/concerts, reading books and journeys. The most frequently recorded activity in one year was reading book (75%). The least activity was travelling/journeys for days with 44% of the respondents. The other significant activity was exhibitions, which was practiced by 66% of the total. Regarding the fixed frequency, the study included children, pet care and managing current account. Respondents with children were 75% while those that always or often care for pets were 77%. Also, 63% of the participants were managing their current accounts.

The scores of the three subsections of CRIq; education, working activity and leisure time were correlated with age. The raw scores for education was r=0.639, working activity with r=0.505 and leisure time r=0.556. The age effect was accounted for by standardizing the raw sub-scores through linear models where each sub-score was the dependent variable and age was the predictor variable. Therefore, it provided standardized scores of CRIq for every section and the total CRIq score. The CRI was transferred to the scale with M=99, and SD=15. The total scores of CRI were categorized into five levels: Low (<70), Medium Low (70-84), Medium (85-114), Medium High (115-130, High (>130).

The Cognitive Reserve Index Score

Among the 150 participants of this study, no subject had low CRI score. The raw score for CRI education was higher in the group aged 55-60 (M=25.93 and SD=7.53) as compared to those aged from 61-65 years (M=18.70 and SD=7.30) and those from 66-70 years (M=7.29 and SD=6.39). Professional work was the most frequent occupation level recorded where those below 60 years accounted for 39% of the total sample while those aged between 61 and 70 years more frequently reported unskilled and skilled manual work (45% and 60% respectively). In CRI leisure time, the frequently reported activities were driving, reading newspapers and magazines, sports, using new technology and domestic chores. Regarding gender differences, women had slightly higher raw score for CRI education, but lower raw scores for CRI leisure time and working activity.

The total CRI score strongly correlated with all the three sub-scores where the correlation with CRI education, CRI working activity and CRI leisure time was r=0.775, r=0.854 and r=0.785 respectively. However, the inter-correlations between sub-scores were low since between CRI education and working activity raw score was r=0.506, between CRI education and leisure time, r=0.352 and CRI working activity and leisure time r=0.529.

All the total scores for CRI as well as each particular sub-score were significantly influenced by age. Those aged up to 60 years had higher CRI score (M=109.49, SD=15.20) than those aged up to 65 years (M=99.35, SD=11.45) as well as those aged up to 70 years (M=90.51, SD=16.13). Also, all the post-hoc comparisons were significant at 0.05 level, where F=34.7 and p<0.001. The group aged between 61 and 65 also exhibited higher CRI education (F=6.41, p<0.05), CRI leisure time (F=25.72, p<0.01) and CRI working activity (F=43.61, p<0.01) than the other two groups. Again, all the post hoc comparisons in the groups were significant at the 0.05 level. The interaction of age accounted for a considerable variance amount of CRI and CRI sub-score.

The IQCODE Assessment

This test offered situations that made respondents use their intelligence or memory to determine whether it has improved, gotten worse or remained the same over the past ten years. The questions had a 5-likert scale,
providing five choices the respondent would choose from: much improves, a bit improve, not much change, a bit worse and much worse. The rating scale was designed deliberately to reflect the cognitive improvement and decline.

After ten years all respondents their ability to remember things have not improved even a bit, but have only either gotten worse, a bit worse or changed a little. Some of the things most respondents could remember were; remembering what day and month it is (88%), knowing how to work familiar machines around the house (85%) and Following a story in a book or on TV (84%). On the other hand, things that respondents could barely remember were; handling financial matters e.g. the pension, dealing with the bank (13%), Making decisions on everyday matters and handling everyday arithmetic (11%) and Learning new things in general (66%).

Perspective on Cognitive Stimulation Activity To Maintain Cognitive Function

Ten questions were used to understand participants’ perspectives regarding how cognitive simulation activity to preserve cognitive function. From the findings most respondents (65%) agreed that CSA helps in promoting good cognitive function and while 85% of the respondents approved that social networking severely promoted cognitive function with age. Also over 80% of the respondents mentioned that mental and physical activity facilitates good cognitive function. As a result, more than 55% agreed that it is important to have mental and physical activities or have hobby or part time activities to improve cognitive function. When asked if cognitive stimulation activities are organized in the community, most (65%) said that a little of them are available while 35% did not know when they existed.

Overall Discussion

This study on public perspectives and engagement in cognitive stimulation activities shows that cognitive reserve is maintained, especially among the older population by involving in activities that improve the brain performance. Some the activities indicated from the results that can preserve cognitive reserve were driving, reading, and playing chess, which promote brain function. These findings are constituent the study of Eckroth-Bucher and Siberski on exercise that improve cognition through training and stimulation programs. The authors indicate that cognitive stimulation has direct effects on the brain substrates, which support cognition. They add that physical exercise and simulating environments promote neurogenesis, enhance neuronal plasticity and prevent cell death.

These results are consistent with the study by Jansen et al. where they mentioned that cognitive impairment is attributed to aging population as compared to a young person. Higher remembrance scores among the older population are on daily easy tasks such as daily chores because they are used to doing them every day.

Most of the participants believed that cognitive stimulation activities such as social networking as well as physical and mental activities facilitate cognitive function with age. Other studies also showed that better cognitive functioning is associated with high levels of social integration and activity. Beside, positive connection between social support and cognate function among the older people, which is consistent with the current study has been reported. Moreover, Wilson et al. found that frequent mental and physical activities positively lead to cognitive function among the elderly, which matches with the results found in this study.

The questions on the engagement in the cognitive stimulation activity were aimed to understand the respondents’ involvement in activities that can maintain cognitive function. Most of the respondents engaged in CSA activities by living a healthy life that prevents poor cognitive function. Most were willing to participate in cognitive stimulation programmes in their community to promote better quality life. Over 50% of the respondents also mentioned that keeping fit and modifying lifestyle can assist in maintaining cognitive function. These results are consistent with other studies who found out that staying fit enhances mental health and cognitive function.

Conclusion

Results were obtained from three instruments and they included the cognitive reserve index questionnaire, the IQCODE questionnaire and questions on perception and engagement in CSA. These different data collection instruments facilitated the production of complex feedback on the relationship between CSA and better cognitive and mental function. From the CRIq, respondents with high education level and vocational training recoded better cognitive function.
On the aspect of working activity, most respondents did skilled annual work as well as professional work, which are associated with high cognitive function. From the IQCODE questionnaire, where the intelligence and memory of respondents was measured shows the events that older people can remember after ten years. The most remembered events are the current day and month and operating familiar home appliances. However, most of the participants hardly remembered handling financial matters and arithmetic. These results indicated that older people are likely to remember activities they do on a daily basis that those involves complex computation of numbers.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Quality of Life in Adults with Androgenic Alopecia

Lim Wan Chyi¹, Eugenie Sin Sing Tan², Chew Kek Lee³, Navedur Rehman², Loh Wei Chao⁴, Tan Chung Keat²

¹Medical Doctor, Crown Clinic, Kuala Lumpur, Malaysia, ²Faculty of Medicine and Health Sciences, UCSI University, Kuala Lumpur, Malaysia, ³Medical Doctor, Pantai Hospital Cheras, Kuala Lumpur, Malaysia, ⁴Faculty of Medicine and Health Sciences, Universiti Putra Malaysia

Abstract

Androgenic alopecia (AGA) is a common hair loss disease with genetic predisposition among men and women. AGA may start any age after puberty and is affecting one’s social aspects as well as significantly impacted psychological and overall of quality of life. Medically, AGA is considered a mild dermalogical illness. However, those suffering from the illness might feel that alopecia is a serious condition with major distress in life and how other people view them as well as their employment opportunities. As hair is a crucial component of one’s appearance and self-identity, patients with androgenic alopecia (AGA) may experience a self-confident distorted and negative feelings of social disadvantages, dissatisfaction, embarrassment, and lack of self-confidence. The purpose of this study was to assess the quality of life among local adults with androgenic alopecia, using 2 validated questionnaires: The Dermatology Life Quality Index (DLQI) and the Hairdex Score System (HSS). Association between quality of life in AGA patients with gender, age group, marital status and employment status was also evaluated. This cross-sectional study was conducted among adults with androgenic alopecia visiting a private clinic in Cheras, Selangor. In this research study, 125 patients (84 male and 41 females) (aged 20 years and above) completed 2 validated questionnaires, DLQI and HSS. Statistical Package for Social Science (SPSS) is used in this study. The results showed that quality of life impairment increases with increasing severity of androgenic alopecia. (p=0. 000). Males had higher impairment of quality of life than females. (p=0. 000) The quality of life in employed patients was more impaired than the unemployed. (P<0.01) The study can conclude that Androgenic Alopecia shows a considerable impact on quality of life among adults.

Keywords: Androgenic alopecia; AGA; hair loss; life; quality

Introduction

Androgenic alopecia (AGA) is a common hair loss disease with genetic predisposition among men and women. AGA may start any age after puberty and is affecting one’s social aspects as well as significantly impacted psychological and overall of quality of life¹.

Medically, AGA is considered a mild dermalogical illness. However, those suffering from the illness might feel that alopecia is a serious condition with major distress in life and how other people view them as well as their employment opportunities².

In women, AGA develop with a diffuse thinning over the scalp producing a “Christmas tree like” pattern. The thinning is from the top of the scalp towards the front, maintaining the frontal hairline. While in most men, AGA commonly develops markedly individually. It can happen with different type of patterned hair line recession³.

However, some of the women with excessive androgen production might also develop a male-like hair loss. And some of the men might occasionally experiencing a female type hair loss. And there is a commonly misdiagnosed in frontal fibrosing alopecia in women, which is a type of scarring alopecia with recessing hairline in women. Where the diagnosis is
in doubt, a biopsy be done. It has been reported that patients with androgenic alopecia have low self-esteem, lack of confidence and impairing their quality of life.

There are also studies reported that dissatisfaction with self image, identity, appearance, lack of self confidence, and embarrassment in AGA patients. AGA patient may also have a negative impact on personal relationships, sports activities, and employment opportunities.

As hair is a crucial component of one’s appearance and self identity, patients with androgenic alopecia (AGA) may experience a low self esteem and negative feelings of social disadvantages, dissatisfaction, embarrassment, and lack of self-confidence. In Malaysia, there are limited data on the impact of androgenic alopecia. In Cheras, Selangor this issue is unknown and would be interesting to study.

Many studies have been conducted previously about quality of life in androgenic alopecia patients. However, in Malaysia, no similar study was conducted among the local population. This study is done to analyze the quality of life among local adults with androgenic alopecia. The analysis was done in terms of its association of androgenic alopecia with age, gender, severity and employment among the local population.

Methodology

This study will be a cross sectional survey with the questionnaire. The total time interval from the identification of topics, data collection, and analysis and until the final submission of the paper will be 6 months. The research proposal and ethics form, patient informed consent, case report form and other relevant forms/permission letters will be sent to the ethical committee for notification purpose. 125 patients will be taken into the study, who fulfill the inclusion and exclusion criteria, visiting the study location which is Crown Clinic, Cheras, Selangor. Sampling method will be based on inclusion and exclusion criteria. The inclusion criteria is, i) Patients who are age above 21 years old, ii) Presence of androgenic alopecia during the survey, iii) Gender: both male and female, iv) Nationality: Malaysian, v) Race: All races vi) Educational level: Able to read and write in English, vii) Patients who have healthy mentally and physically. The exclusion criteria is patients with existing chronic medical illness.

As for data collection, Patients who complain androgenic alopecia and visiting the study location will be identified and screened based on inclusion and exclusion criteria. Patients who are fulfilling the inclusion and exclusion criteria will be informed about the study and if they agree to participate, they will be given consent form, patient information form and case report form to be filled. Severity of androgenic alopecia will be assessed, then by the investigator using Norwood-Hamilton classification for male and Ludwig classification for female and grade will be given. Patients are then given the DLQI and HSS questionnaire to answer. The DLQI and HSS questionnaires consist of 10 and 20 questions each and will not take more than 20 minutes to be answered. Participation in the survey will be voluntary and patients are allowed to change their mind at any time and withdraw from the study without giving a reason if they intend to. Statistical analysis will be performed with Statistical Package for the Social Sciences, SPSS version 19.0.

Result and Discussion

Based on the analysis done, it was found that, 17 (13.6%) patients had Norwood Class Type I and among them 1 patient (0.8%) gave a score of 0-1, 1 patient (0.8%) gave a score 2-5, 15 patients (12.0%) gave a score 11-20. 14 (11.2%) patients had Norwood Class Type II, 13 (10.4%) patients gave a score 11-20, and 1 patient (0.8%) gave a score >20. A total of 28 (22.4%) patients had Norwood Class Type IIa, 1 (0.8%) gave a score 6-10, 27 (21.6%) patients gave a score 11-20. 9 (7.2%) patients had Norwood Class III, all of them gave a score of 11-20. 10 (8.0%) patients had Norwood Class Type III Vertex, 1 (0.8%) gave a score 6-10, 9 (7.2%) gave a score 11-20. 2 (1.6%) patients had Norwood Class IIIa, 2 (1.6%) gave a score 11-20. 2 (1.6%) patients had Norwood Class Type IV gave a score 11-20. 1 (0.8%) had Norwood Class IVa and 1 (0.8%) had Norwood Class V, who gave a score 6-10 and score 11-20 respectively. A total 41 (32.8%) female patients had Ludwig Type 1, all of them gave a score 11-20.

HSS score for Norwood Class I has sample mean of 2.1765 and standard deviation of 0.72761, Norwood class II has sample mean 2.5 and standard deviation of 0.65044, Norwood class IIa has a sample mean of 2.25 and standard deviation of 0.84437, Norwood class III has a sample mean 2.444 and standard deviation of 0.72648, Norwood class III vertex has a sample mean of
2.2 and standard deviation of 0.91894, Norwood Class IIIa has a mean sample of 2.0 and standard deviation of 1.41421, Norwood Class IV has a mean sample of 1.0, Norwood Class IVa has a mean sample of 1.0 and Norwood Class V has a mean sample of 2.0. The Ludwig type 1 has a mean sample of 2.3650 and standard deviation of 0.62274.

In the homogeneity of variances in severity and HSS Score, the P-value or Levene Statistic is 0.009, which is less than 0.0. Therefore the result is significant as shown in Table 1.

From the Table 2, Anova test for severity and HSS score showed the P value of 0.216, which is more than 0.05, therefore the result is significant. The HSS score depends on the severity of androgenic alopecia. In addition, outcome of Tamhane test shows that DLQI scores of different age group significant differs with each other (P<0.05).

Based on Table 4, DLQI score for single patients with a sample mean of 4.00 and standard deviation of 0.00, married patients with a sample mean of 3.9817 with a standard deviation of 0.19157, in a relationship patient with a sample mean of 3.3750 with a standard deviation of 1.18773. Thus, there is a significant association between ages and DLQI in this group.From Table 5, outcome of Tamhane test shows that DLQI score of different status significantly differs with each other (P<0.005).From Table 6, Pearson Chi-Square statistic is 5.765 and degree of freedom is 4. The P-value is more than 0.01. The minimum expected count is 0.37, which is below 1. Thus, there is a significant association between employment status and DLQI in this group.

### Table 1. Test of Homogeneity of Variances for severity and HSS Score

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variances</th>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.845*</td>
<td>7</td>
<td>115</td>
<td>.009</td>
</tr>
</tbody>
</table>

### Table 2. ANOVA Test for severity and HSS Score

<table>
<thead>
<tr>
<th>ANOVA HSS SCORE</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>6.645</td>
<td>9</td>
<td>.738</td>
<td>1.357</td>
<td>.216</td>
</tr>
<tr>
<td>Within Groups</td>
<td>62.555</td>
<td>115</td>
<td>.544</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>69.200</td>
<td>124</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3. Chi-Square Tests for Ages and DLQI Score

<table>
<thead>
<tr>
<th>Chi-Square Tests</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>23.611*</td>
<td>12</td>
<td>.023</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>15.664</td>
<td>12</td>
<td>.207</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>5.851</td>
<td>1</td>
<td>.016</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>125</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 4, DLQI score for single patients with a sample mean of 4.00 and standard deviation of 0.00, married patients with a sample mean of 3.9817 with a standard deviation of 0.19157, in a relationship patient with a sample mean of 3.3750 with a standard deviation of 1.18773. Thus, there is a significant association between ages and DLQI in this group.From Table 5, outcome of Tamhane test shows that DLQI score of different status significantly differs with each other (P<0.005).From Table 6, Pearson Chi-Square statistic is 5.765 and degree of freedom is 4. The P-value is more than 0.01. The minimum expected count is 0.37, which is below 1. Thus, there is a significant association between employment status and DLQI in this group.
Table 4. Difference marital status and DLQI Score Descriptives

<table>
<thead>
<tr>
<th>MDLQI SCORE</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>95% Confidence Interval for Mean</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>8</td>
<td>4.0000</td>
<td>.00000</td>
<td>.00000</td>
<td>4.0000</td>
<td>4.0000</td>
<td>4.00</td>
</tr>
<tr>
<td>Married</td>
<td>109</td>
<td>3.9817</td>
<td>.19157</td>
<td>.01835</td>
<td>3.9453</td>
<td>4.0180</td>
<td>3.00</td>
</tr>
<tr>
<td>In a relationship</td>
<td>8</td>
<td>3.3750</td>
<td>1.18773</td>
<td>.41993</td>
<td>2.3820</td>
<td>4.3680</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>3.9440</td>
<td>.36597</td>
<td>.03273</td>
<td>3.8792</td>
<td>4.0088</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Table 5. Post Hoc Test for Different Status and DLQI Score Multiple Comparisons

<table>
<thead>
<tr>
<th>Element</th>
<th>(I) Status</th>
<th>(J) Status</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSD</td>
<td>Single</td>
<td>Married</td>
<td>.01835</td>
<td>.12337</td>
<td>.882</td>
<td>-.2259</td>
<td>.2626</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>.62500'</td>
<td>.16840</td>
<td>.000</td>
<td>.2916</td>
<td>.9584</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>Single</td>
<td>-.01835</td>
<td>.12337</td>
<td>.882</td>
<td>-.2626</td>
<td>.2259</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>.60665'</td>
<td>.12337</td>
<td>.000</td>
<td>.3624</td>
<td>.8509</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>Single</td>
<td>-.62500'</td>
<td>.16840</td>
<td>.000</td>
<td>-.9584</td>
<td>-.2916</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>Married</td>
<td>-.60665'</td>
<td>.12337</td>
<td>.000</td>
<td>-.8509</td>
<td>-.3624</td>
<td></td>
</tr>
<tr>
<td>Tamhane</td>
<td>Single</td>
<td>Married</td>
<td>.01835</td>
<td>.01835</td>
<td>.685</td>
<td>-.0262</td>
<td>.0629</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>.62500</td>
<td>.41993</td>
<td>.449</td>
<td>-.6832</td>
<td>1.9332</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>Single</td>
<td>-.01835</td>
<td>.01835</td>
<td>.685</td>
<td>-.0629</td>
<td>.0262</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>.60665</td>
<td>.42033</td>
<td>.472</td>
<td>-.7014</td>
<td>1.9147</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>Single</td>
<td>-.62500</td>
<td>.41993</td>
<td>.449</td>
<td>-1.9332</td>
<td>.6832</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In a relationship</td>
<td>Married</td>
<td>-.60665</td>
<td>.42033</td>
<td>.472</td>
<td>-1.9147</td>
<td>.7014</td>
<td></td>
</tr>
</tbody>
</table>

*The mean difference is significant at the 0.05 level

Table 6. Chi-Square Test for Employment Status and DLQI Score Chi-Square Tests

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>5.765*</td>
<td>4</td>
<td>.217</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>7.671</td>
<td>4</td>
<td>.104</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>1.509</td>
<td>1</td>
<td>.219</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>125</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thus overall, Androgenic alopecia commonly begins at the ages of 12 to 40 years in both female and male. The severity of androgenic alopecia is highest in Caucasian than Asians and African. In the present study, 125 patients with AGA and DLQI was used to assess their quality of life. The number of Chinese patients were 109 (87.2%) as compared to 11 (8.8%) Malay patients and 5 (4%) Indian patients.

The quality of life patients with androgenic alopecia is measured via the dermatology life quality index (DLQI) and Hairdex Score System (HSS). For the purpose of statistical analysis, both the DLQI and HSS scores are used. Analysis reveals that the severity of androgenic alopecia has significant outcome of the patients’ daily activities. The analysis of DLQI score and severity of AGA showed that DLQI is not dependent on severity, however the results were not conclusive.

From the analysis of HSS score, the mean of HSS score becomes higher when the severity of androgenic alopecia is higher, showing a significant difference between mean score and severity in the study. A similar finding was noted by Cartwright, Endean et al. in their study, which reported a positive association between androgenic alopecia severity and poorer quality of life. This is because when the patients has a more severe form of AGA, he or she may feel more embarrassed, vulnerability and lack of confidence and would avoid social activities such as meeting their friends on leisure time, going shopping, outdoor activities and even engaging in sports. This finding was also supported by the previous research done by SawanChikhalkar et al. in hair clinic of the dermatology outpatient of Hospital in Mumbai. There are a few studies done in which the results showed that impairment of quality of life in female were more than men. There is also supported by a study done by Masmoudi, Sellami et al. where the female more psychological impact compared to male as they believed the physical appearance can indeedly increase a woman’s self-esteem.

In this study, the patient’s age was also correlated to the psychological impact. This finding was also supported by the previous research done by the Korea multicenter study among the local population where the younger age group has a significantly higher impact on their quality of life. A similar finding was also noted in the study done by Bhargava et al. where the quality of life was more pronounced in the younger populations.

The hair loss was indeedly more concern and most vulnerable in the younger age. This result, however, stands in contrast to the previous study done by Sawant, Chikhalkar et al. where older patients seemed to be more severely distressed.

**Conclusion**

The current study concluded that the patients with androgenic alopecia has significantly impact on their quality of life. There is an association between patients’ psychological perception about their illness and the severity of their condition. From the results, it concluded that the strong relation between the severity of androgenic alopecia and patients’ quality of life impairment among local adults. It shows that the patients with increase severity of androgenic alopecia has a significantly decreased their quality of life. As for the gender-based response, the quality of life in males was more affected than female patients and the employed patients more suffered quality of life impairment if compared to the unemployed patient. Not surprisingly, the finding concluded that the younger age group who suffering androgenic alopecia had more impact than older groups. It is strongly believed that physical appearance is important for the younger age patients. With the onset of hair loss could significantly reduce their self-esteem and might face difficulty in finding a life partner or looking for an employment. As androgenic alopecia shows a significant affection of quality of life among the patients, measures should be taken to treat it early and effectively.

**Acknowledgment:** This work was supported by internal funding from CERVIE UCSI University (Proj-In-FAS-024)

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Factors Associated with Beliefs and Attitudes in Organic Food Purchase among Adults in Klang Valley

Lee Keat Yan¹, Kavita Chirara¹
¹Faculty of Applied Sciences, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract
Organic food are produced without the use of fertilizers, pesticides, growth hormones, genetic modified, irradiation and antibiotics. The aim of this research is to examine whether there is an association between the four variables (product, lifestyle, regulatory and ethnocentrism) and beliefs and attitudes in organic food purchase among adults in Klang Valley. This research is conducted by quantitative method and using questionnaire with a title of “factors associated with beliefs and attitudes in organic food purchase among adults in Klang Valley” for data collection. Furthermore, this research targeted on adults with age ranging from 18-64 years old. The sample size consists of 350 respondents and all the data were collected in the Klang Valley area. Data analysis were performed by using Software Package for Social Sciences (SPSS) Version 19. Three hypothesis related to product, lifestyle and regulatory was accepted and one hypothesis related to ethnocentrism was rejected. The result shows that there is a significant positive association between the three variables (product, lifestyle and regulatory) on beliefs and attitudes in organic food purchase among adults in Klang Valley.

Keywords: Organic food; factors; purchase; attitudes; adults

Introduction
These days, enthusiasm for naturally delivered nourishment is expanding all through the world because of worries about agrarian practices and their potential consequences for human wellbeing and on the earth¹. As indicated by Sheng et al.², natural sustenance industry has been quickly developed far and wide with the aggregate territory of 30.5 million hectares. Other than that, the worldwide natural market has accomplished 23 billion USD in 2003. In 2005, the market has come to 33 billion USD, constantly expanded to 40 billion USD in 2006². Furthermore, around 90 creating nations, of which around 15 are Least Developing Countries (LDCs) are delivering affirmed natural and picking up the critical offer from the worldwide natural nourishment showcase³.

In Malaysia, the fast financial improvement, increment in way of life, and changes in way of life has changed the structure of agri-nourishment generation so as to take care of the demand by the more rich society. In this way, the interest for natural sustenance is significantly ascending in Malaysia as the populace turns out to be progressively instructed about wellbeing and health issue that prompts a more noteworthy cognizance in the nourishment decisions ⁴. In 2001, for example, just 131 hectares (ha) in Malaysia were natural ranches. In the following five years, the land zone for natural homesteads quickly developed by multiple times to 2,367 ha, of which 962 ha are maybe guaranteed natural,⁵. In any case, The Malaysian Agricultural Research and Development Institute (MARDI) expressed that the neighborhood natural sustenance industry is still of a little source. Moreover, in excess of 60% of natural sustenance items are transported in⁶.

Next, past investigations have demonstrated that the three most concerning components of shoppers in natural sustenance utilization are nourishment security, the insurance of the earth and creature welfare⁷. Other than that, past investigations are concentrating more on how statistic qualities influence shopper acquiring conduct on natural nourishment⁸. In spite of the fact that
there are numerous investigations have been directed and they have recognized different variables or determinants which influencing purchaser acquiring conduct toward natural nourishment. Shockingly, the outcomes that acquired are not steady.

In Asian nations, the interest of natural sustenance isn’t as high as Western nations. In this way, enhancing open mindfulness and discernment towards natural sustenance will build customers’ goals to buy natural nourishment. In Malaysia, there are as yet various individuals who are new towards natural nourishment. The assortment of natural sustenance is lesser contrasted with ordinary nourishments and the greater part of the purchasers are worried about the cost of natural sustenances and not willing to paid for it.

The principle reason for this exploration is to examine how the accompanying measurements: item, administrative, way of life and ethnocentrism related with convictions and frames of mind in natural nourishment buy among grown-ups in Klang Valley.

Methodology

Study Design and Sampling Method

This is a cross-sectional investigation which is led to discover the pervasiveness of the result of enthusiasm inside the populace at a given timepoint. This study meant to assess the variables that related convictions and frames of mind in natural nourishment buy among grown-ups.

Study Location

This research study was carried out in public area of Klang Valley. Thus, this study will be carried out in Mid Valley shopping mall, Aeon Cheras Selatan, Aeon MahkotaCheras, BMS Organic Shop and Carelife Organic Shop.

Study Subject and Sample Size

In this research all the respondents is within the age of 18-64 years old which from Klang Valley area. The sample size of this survey can be determined by using the formula stated below. Therefore the total number of sample size calculated by using the formula was 350 Malaysian adults.

Data Source and Collection

In this examination, every one of the information are gathered from essential sources and optional information. Essentially this survey was isolated into two sections: area A was social statistic profile and general data while segment B was build estimation. In area A, there were an aggregate of eight inquiries asked under the respondents’ statistic segment which included age, sexual orientation, ethnicity, conjugal status, month to month salary, staying condition, instruction level and occupation. In segment B there are an aggregate of 28 questions were adjusted from questions were adjusted from. In this study, 340 of questionnaires were distributed to the respondents. There were 310 usable questionnaires returned for a response rate of 91.2%.

Data Analysis

Data was examined utilizing Statistical Package for Social Science (SPSS) Version 19. Cronbach’s Alpha test was utilized to test the interior unwavering quality of information. Pearson’s connection was led to estimated the connection between the factors.

Result and Discussion

Mean Score of Product

Table 1 shows the respondents reaction towards questions related to product. The question of “Organic food has high nutritional value” has the highest mean of 4.11. The overall mean for all the questions related to product is 3.587 which is the second highest after lifestyle.

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic food has a pleasant texture</td>
<td>3.67</td>
</tr>
<tr>
<td>2</td>
<td>Organic food looks nice.</td>
<td>3.70</td>
</tr>
<tr>
<td>3</td>
<td>Organic food smells nice.</td>
<td>3.41</td>
</tr>
<tr>
<td>4</td>
<td>Organic products are in fashion.</td>
<td>3.05</td>
</tr>
<tr>
<td>5</td>
<td>Organic food has high nutritional value.</td>
<td>4.11</td>
</tr>
<tr>
<td></td>
<td>Overall Mean</td>
<td>3.5897</td>
</tr>
</tbody>
</table>
Mean Score of Regulatory

Table 2 shows the respondents reaction towards questions related to regulations. The question of “logos depicting types of organic foods should be controlled” has the highest mean value of 4.05. The overall mean for all the questions related to regulations is 3.9116 which is the highest among all the factors.

Table 2. Mean score of questions related to regulatory

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>When I buy a food product, I always read the label.</td>
<td>3.88</td>
</tr>
<tr>
<td>2</td>
<td>Lack of adequate government control of media allows advertisers to take advantage of consumers.</td>
<td>3.79</td>
</tr>
<tr>
<td>3</td>
<td>Logos depicting types of organic foods should be controlled.</td>
<td>4.05</td>
</tr>
<tr>
<td>4</td>
<td>More land should be allocated for organic farming.</td>
<td>4.03</td>
</tr>
<tr>
<td>5</td>
<td>The market for “organic” and “green” products are hard to differentiate.</td>
<td>3.80</td>
</tr>
<tr>
<td></td>
<td>Overall Mean</td>
<td>3.9116</td>
</tr>
</tbody>
</table>

Mean Score of Lifestyle

Table 3 shows the respondents reaction towards questions related to lifestyle. The question of “I am often influenced by advertisements of new products” has the highest mean of 3.94. The results show that respondents do poses an opinion leadership characteristic. The overall mean for all the questions related to lifestyle is 3.4457.

Table 3. Mean score of questions related to lifestyle

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I always try something new and unique.</td>
<td>3.64</td>
</tr>
<tr>
<td>2</td>
<td>I love fashionable and trendy products.</td>
<td>3.33</td>
</tr>
<tr>
<td>3</td>
<td>I am often influenced by advertisements of new products.</td>
<td>3.94</td>
</tr>
<tr>
<td>4</td>
<td>I can easily influence people around me during conversation.</td>
<td>3.22</td>
</tr>
<tr>
<td>5</td>
<td>My friends often consult me when they cannot make up their own mind.</td>
<td>3.09</td>
</tr>
<tr>
<td>6</td>
<td>I have strong desire to be successful.</td>
<td>3.46</td>
</tr>
<tr>
<td></td>
<td>Overall Mean</td>
<td>3.4457</td>
</tr>
</tbody>
</table>

Mean Score of Ethnocentrism

Table 4 shows the respondents reaction towards questions related to ethnocentrism. The question of “Malaysian should buy domestic products rather than imported products” has the highest mean of 3.41. The overall mean for all the questions related to ethnocentrism is 3.2368 which is the lowest among all the factors.

Table 4. Mean score of questions related to ethnocentrism

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Malaysian should buy domestic products rather than imported products.</td>
<td>3.41</td>
</tr>
<tr>
<td>2</td>
<td>Malaysia should levy tariff on foreign products to reduce their quantity into Malaysia.</td>
<td>3.19</td>
</tr>
<tr>
<td>3</td>
<td>Malaysian should not buy foreign products, because it would affect domestic business, and causes more unemployment.</td>
<td>3.10</td>
</tr>
<tr>
<td></td>
<td>Overall Mean</td>
<td>3.2368</td>
</tr>
</tbody>
</table>
Mean Score of Beliefs and Attitudes

The question of “Organic food is good for the environment” has the highest mean of 4.01. Therefore, consumers believe that purchase organic food will benefit to the environment as organic food is produced naturally. Furthermore, question of “I believe organic food has superior quality” has the second highest mean of 3.94. This is consistent to the previous literature review which mentioned that purchase organic food was an event of selecting quality goods. The overall mean for all the questions related to beliefs and attitudes is 3.4430 which is the second lowest among all the factors.

Scale Measurement

In view of Table 5, In this investigation, Cronbach’s alpha was use to analyze the inside dependability of the 28 things and used to gauge the 5 builds. Every one of the builds extended from 0.649 to 0.774. While ethnocentrism had the most noteworthy coefficient (0.774) and item had the least coefficient (0.649). Besides, every one of the builds under scrutiny fall on the moderate solid class.

Table 5. Reliability test

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach’s Alpha</th>
<th>Number of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>0.649</td>
<td>5</td>
</tr>
<tr>
<td>Regulatory</td>
<td>0.733</td>
<td>5</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0.725</td>
<td>6</td>
</tr>
<tr>
<td>Ethnocentrism</td>
<td>0.774</td>
<td>3</td>
</tr>
<tr>
<td>Beliefs and Attitudes</td>
<td>0.735</td>
<td>9</td>
</tr>
</tbody>
</table>

Inferential Analysis Pearson Correlation Analysis

As indicated by Table 6, it has demonstrated that the relationship network for the four inspected factors which were item, way of life, administrative and ethnocentrism. Every one of the builds demonstrates positive relationships since none of the develops had negative sign.

In this investigation, way of life has demonstrated that $r = 0.558$ which is the most noteworthy among every one of the develops, critical at 0.01 dimension. In addition, way of life falls on the moderate solid class. Next, it was item with a moderate solid relationship $(r=0.509)$, administrative with a frail relationship $(r=0.358)$. In any case, theory 4 was rejected on the grounds that the outcomes show ethnocentrism has a positive relationship $(r=0.208)$ on convictions and dispositions to buy natural nourishment. In this manner, we can infer that ethnocentrism has noteworthy positive effect on convictions and frames of mind in natural sustenance buy rather than negative impact. All connections were noteworthy at 0.01 dimension.

Table 6. Pearson Correlation Analysis

<table>
<thead>
<tr>
<th></th>
<th>Product</th>
<th>Regulatory</th>
<th>Lifestyle</th>
<th>Ethnocentrism</th>
<th>Beliefs and Attitudes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product</td>
<td>1</td>
<td>.425**</td>
<td>.388**</td>
<td>.262**</td>
<td>.509**</td>
</tr>
<tr>
<td></td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Regulatory</td>
<td>300</td>
<td>310</td>
<td>310</td>
<td>310</td>
<td>310</td>
</tr>
<tr>
<td></td>
<td>310</td>
<td>310</td>
<td>310</td>
<td>310</td>
<td>310</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>1</td>
<td>.329**</td>
<td>.142*</td>
<td>.358**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.000</td>
<td>.012</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>310</td>
<td>310</td>
<td>310</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>310</td>
<td>310</td>
<td>310</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>.125*</td>
<td>.558**</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>.028</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Table 6. Pearson Correlation Analysis**

<table>
<thead>
<tr>
<th></th>
<th>310</th>
<th>310</th>
<th>310</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnocentrism</td>
<td>1</td>
<td>.000</td>
<td>.208**</td>
</tr>
<tr>
<td>Beliefs and Attitudes</td>
<td>310</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>310</td>
<td></td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

*Correlation is significant at the 0.05 level (2-tailed).**

**Overall Discussion**

For H1: Organic sustenance item related properties has a positive relationship on the convictions and demeanors in natural nourishment buy among grown-ups in Klang Valley. In light of the outcome appeared, the relationship between item related properties with the convictions and dispositions in natural sustenance buy among grown-ups is huge at 0.01 dimension with a r-estimation of 0.509. Item is the second most critical build that related customer’s convictions and frames of mind after the way of life develop. This present finding is predictable with the result of Chen which they discovered that item related traits have impact on shopper’s buy aim towards natural nourishment.

For H2: Regulations related with natural nourishment has a positive relationship on the convictions and dispositions in natural sustenance buy among grown-ups in Klang Valley. The relationship between administrative with the convictions and frames of mind in natural nourishment buy among grown-ups is critical at 0.01 dimension with arvalue of 0.358. This is predictable with Chen ponder which he discovered that individuals trust that with government bolster, the nature of natural sustenance would be upgraded and their wellbeing would be moved forward.

For H3: Lifestyle has a positive relationship on the convictions and demeanors in natural sustenance buy among grown-ups in Klang Valley. The relationship between way of life with the convictions and frames of mind in natural nourishment buy among grown-ups is huge at 0.01 dimension with a rvalue of 0.558. Way of life is the most vital develop that related shopper’s convictions and frames of mind in natural nourishment buy. The outcome is predictable with an examination led by Gill et al. which they discovered that way of life is an essential factor in clarifying natural nourishment utilization.

Lockie et al. recommend that utilization of natural nourishment mirrors a ‘greening customer ways of life’. They trust that by expending natural sustenance will profit to the earth since natural nourishment don’t have pesticides.

As indicated by Table 3, respondents would love to have a go at something new and in vogue along these lines they might want to attempt more and appreciate the natural sustenance traits. This is bolstered by Rotiner-Schobesberger et al. as they uncovered that the second most imperative intention in the buy of natural nourishment was its fascination as new and in vogue. As more data is attained, shopper will have higher mindfulness and information of their own wellbeing which will make an interest for natural nourishment.

Subsequently, the present examination proposes that way of life has a positive relationship on the convictions and frames of mind in natural sustenance buy among grown-ups in Klang Valley.

For H4: Ethnocentrism has a negative relationship on the convictions and mentalities in natural nourishment buy among grown-ups in Klang Valley. Result showed that Ethnocentrism has a negative relationship on the convictions and dispositions in natural sustenance buy among grown-ups in Klang Valley.

Then, as natural nourishment is seen as earth agreeable, hence customers may will in general buy natural sustenance from nearby sources rather than transported from abroad.

**Conclusion**

Taking everything into account, the fundamental target is to look at the relationship between item,
administrative, way of life and ethnocentrism and shopper’s convictions and demeanors in natural sustenance buy among grown-ups in Klang Valley. This investigation will be noteworthy and helpful to advertisers to advance and expand the offers of natural nourishments by comprehend the purchasing conduct of buyers. As indicated by the last outcomes, all the three autonomous factors (item, administrative and way of life) has positive relationship on customer’s convictions and mentalities in natural sustenance buy among grown-ups. Among the three free factors, way of life is the most grounded factor that related buy goal. As way of life implies the courses gatherings of purchasers invest energy and cash.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Assessment of Knowledge, Attitude and Practice of Malaysian Women towards Cervical Cancer Vaccination

Mohammad Arief1, Loh Jia Ying1

1Faculty of Pharmaceutical Sciences, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract

Cervical cancer vaccination of adolescent girl effectively reduces the risk of developing precancerous lesions caused by the causative agent, Human Papillomavirus (HPV). Cervical cancer is the second leading cause of female cancer in Malaysia despite the availability of HPV vaccine. This study aims to assess the knowledge, attitude and practice (KAP) of Malaysian Women towards cervical cancer vaccination. A cross sectional study was carried out through convenience and purposive sampling method. English literate women with Malaysian citizenship above the age of 18 years old are included into the study. Based on Krejcie and Morgan calculation, a sample size of 384 women is required. Potential women participants were recruited randomly at Klang Valley (which includes Federal Territory of Kuala Lumpur, Selangor districts of Petaling, Klang, Gombak, Hulu Langat) via a self-administered questionnaire that had been validated and pre-tested among 20 women to determine the reliability of the questionnaire. The study result showed that 94.6% of the participants showed good knowledge towards HPV vaccine. On the other hand, the overall attitude and practice level is found to be poor, reported to be 53.1% and 65.1% respectively.

Keywords: Cervical cancer; vaccine; knowledge; attitude; woman

Introduction

Cervical cancer vaccine, also known as HPV vaccine, is an inactivated vaccine that provides protection against Human Papillomavirus (HPV). There are many different types of HPV, categorized into ‘low risk’ and ‘high risk’. Some of high risks HPV leads to cervical cancer1. There are three types of HPV vaccines available in the market, Cervarix®, Gardasil® and Gardasil-9®. These current HPV vaccines work based on virus-like particles (VLPs) which closely resemble the natural virus and stimulate the production of antibodies which will bind to any HPV virus encounter in the future and prevent it from infecting healthy cells. Lacking of virus’s DNA makes VLPs not infectious but remains highly immunogenic thus making the vaccine highly effective2. A total course of 3 doses of HPV vaccination are injected over a 6 months period (at 0, 2, 6 months)3.

All HPV vaccines had been proved to be safe and effective by the US Food and Drug Administration (FDA) prior licensing and marketing through three phases of clinical trials. Post licensure safety of vaccine is closely monitored through the Vaccine Adverse Event Reporting System (VAERS), Vaccine Safety Datalink (VSD), Clinical Immunization Safety Assessment Network (CISA) system. There are no serious side effects shown to date and most common problems like nausea, soreness at injection site, fever and etc are usually mild and short-term4. Multiple studies supported that the vaccines are safe to be used5,6.

HPV vaccines are both effective and safe but yet the US National Data from 2014 shows that the vaccination coverage is low. Less than 40% of eligible female completed the three dose injection course even when 60 % of eligible females received the first initial dose7. It is urge to increase the nation vaccine coverage by The President’s Cancel Panel (PCP) and National Vaccine Advisory Committee (NVAC) through 4 goals established by PCP and an additional 3 recommendations made by NVAC8.
Study conducted in the Saudi Arabia concluded that the knowledge and perception of HPV attributed cervical cancer risk and HPV vaccination was low. Only 34.5% participants were aware of HPV while the other 65.5% never heard about it. Most of the respondents (72.6%) did not know about the role of HPV in etiology of cervical cancer. Only 32.3 % participants were aware of the ability of HPV vaccine to prevent cervical cancer and other HPV-related STDs. However, good news was that the rate of acceptance of HPV vaccine was higher among the participants.

In first world country such as Australia, data found from the National HPV Vaccination Program Register (NHVPR) 2003 showed high vaccination uptake rate (86%) of Australian adolescent girls. United Kingdom and Denmark also reported 87% and 89% of school-aged girls receiving at least one vaccine dose, with 85% and 74% receiving all three doses, respectively. Participants showed high level of knowledge; 97% of them knew HPV causes cervical cancer and 99% knew regular Pap Smears were required after HPV vaccination and 68% knew HPV causes genital warts. HPV vaccination uptake rate by women is assessed in other countries yielding different outcomes of levels of knowledge, attitude and practice that vary in association to multiple demographic and socioeconomic characteristics. Such data, however, is lacking in Malaysia to date. Awareness of cervical cancer and HPV vaccination among rural folks in Penang, Malaysia showed low knowledge about HPV and HPV vaccine (29.3% and 42.2% respectively) even most participants (88.8%) knew about cervical cancer. It was shown that the cost of HPV vaccine is a barrier of public folks getting vaccinated.

In Malaysia, Pap smear screening program launched in 1969, however only about 850,000 women have undergone cervical cancer screening tests out of the eligible 5.2 million female populations. Low Pap smear screening rate and low HPV vaccination rate of the female population despite cervical cancer being the second most frequent cancer among women between age 15 to 44 years of age imply that they would be also less aware of knowledge and practice of HPV vaccination.

Thus, this study aims to assess the knowledge, attitude and practice (KAP) of Malaysian Women towards cervical cancer vaccination.

Methodology

Study Design

A cross sectional survey was conducted in Klang Valley for two months (July and August 2017) with the aim to study the KAP of the targeted population on cervical cancer vaccination.

Sampling and Sample Size

A convenience and purposive sampling method was used in this study. Sample size was calculated using Krejcie and Morgan calculation with 5% margin of error and 95% confidence interval. Based on this, the minimum sample size required was 384 for this study. 482 potential participants were approached but 61 of them refused to participate. Out of the 421 filled questionnaires, 392 were analyzable. The respond rate was 81.3%. The inclusion criteria were Malaysian women citizen whom aged between 18-60 and English literate; exclusion criteria were one who refuse to participate and unfit women. The validated questionnaires were given to respondents after they agreed to participate in the study. An informed consent form is attached along with every questionnaire. Participants were aware that their willingness to participate were fully respected. Their anonymity and confidentiality were preserved.

Study Instruments

A self-administered questionnaire was adapted and modified from previous studies. The questions were constructed into four sections. The first section focused on demographic characteristics of participants. The second section addressed the participants’ level of knowledge towards cervical cancer and its vaccine. The third part measured the attitude of participants towards HPV vaccine and the forth part assessed the practice of participants towards HPV vaccine. All the items in the questionnaire were evaluated by experts. A pilot study was undertaken, during the first phase of which a convenience sample of 20 women were asked to complete the questionnaire. Modifications in the questions were done based on the response of the participants and then it was subjected to second phase of pilot study to determine the reliability. Cronbach’s alpha of the final questionnaire was found to be 0.71.

Statistical Analysis

SPSS Software Version 20 was used to analyze data.
Descriptive analysis was used to tabulate the socio-demographic characters in frequencies and percentages. Chi-square test and logistic regression analysis were adapted to assess the association between the socio-demographic characters and the KAP outcomes. A p-value lesser than 0.05 was said to be statistically significant.

**Result and Discussion**

**Knowledge on Cervical Cancer Vaccination**

Based on the analysis done, 376 individuals (95.9%) have heard about cervical cancer. 355 respondents (90.6%) out of 392 know that cervical cancer can be prevented by taking Human Papilloma Virus Vaccine but only 67 respondents (17.1%) of the respondents knows the beneficial age group whom are eligible to receive free HPV vaccine through the national immunization program. As high as 94.1% of respondents have no idea about the cost of HPV vaccination, 79.6% of them have wrong idea about the protective duration of the vaccination and 52.8% (207 respondents) do not know that a total of 3 doses are required for a complete vaccination course. Table 1 shows the level of knowledge as scored by respondents, 21 respondents (5.4%) are reported poor level (0-9) of knowledge and 371 respondents (94.6%) scored good level (10-14) of knowledge. The outcome ranges between minimum score of 1 to maximum score of 14, at mean score of 7 and standard deviation of 2.725. Level of attitude are divided into two groups, poor (0-3) and good (4-6) as shown in Table 2. 53.1% (208 respondents) are reported to have poor attitude.

**Table 1. Distributions of Knowledge Level According to Scores Gained by Respondents**

<table>
<thead>
<tr>
<th>Level of Knowledge</th>
<th>Number (n=392)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor (0-9)</td>
<td>21</td>
<td>5.4</td>
</tr>
<tr>
<td>Good (10-14)</td>
<td>371</td>
<td>94.6</td>
</tr>
<tr>
<td>Total</td>
<td>392</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 11.6   SD= 1.691   Minimum= 0   Maximum=14

**Table 2. Distribution of Level of Attitude According to Positivity of Answers Given by Respondents**

<table>
<thead>
<tr>
<th>Level of Attitude</th>
<th>Number (n=392)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor (0-3)</td>
<td>208</td>
<td>53.1</td>
</tr>
<tr>
<td>Good (4-6)</td>
<td>184</td>
<td>46.9</td>
</tr>
<tr>
<td>Total</td>
<td>392</td>
<td>100</td>
</tr>
</tbody>
</table>

Mode= 3   Median= 3   Minimum= 0   Maximum= 6

**Practice on Cervical Cancer Vaccination**

Table 3 shows a summary of the level of practice of respondents on cervical cancer vaccination. The score ranges from 0-6 with a mode and median score of 4. In general, 34.9% are reported to have a good level (5-6) of practice while the other 255 (65.1%) respondents are reported to have poor level (0-4) of practice.
Table 3. Distribution on Level of Practice According to Positivity of Answers Given by Respondents

<table>
<thead>
<tr>
<th>Level of Practice</th>
<th>Number (n=392)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor (0-3)</td>
<td>255</td>
<td>65.1</td>
</tr>
<tr>
<td>Good (4-6)</td>
<td>137</td>
<td>34.9</td>
</tr>
<tr>
<td>Total</td>
<td>392</td>
<td>100</td>
</tr>
</tbody>
</table>

Mode = 4  Median = 4  Minimum = 0  Maximum = 6

Logistic Regression Analysis of Respondents on KAP on Cervical Cancer Vaccination

Binomial logistic regression analyses were conducted to predict the relationships between dependent variables (level of Knowledge, Attitude and Practice) and independent variables (demographic characteristics). Table 4. shows association between level of knowledge and demographic variables of the participants. Based on Table 4, it is seen that the knowledge of participant towards HPV vaccine is almost moderate with results showing almost comparable outcome. Table 5 shows binomial regression between demographic data and the attitude of participants towards HPV vaccine. Based on Table 5 it is seen that the attitude of participant towards HPV vaccine is good among the higher age group compared to the younger age group. Table 6 represents the association between demographic data and the practice of participants towards HPV vaccine. Based on Table 6, it is seen that the practice of participant towards HPV vaccine is good for all range of ages and ethnics.

Table 4. Association between demographic data and the knowledge of participants towards HPV vaccine

<table>
<thead>
<tr>
<th>Knowledge towards HPV vaccine</th>
<th>p-value</th>
<th>OR (95% CI) Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Good</td>
<td>p-value</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>78 (49.3%)</td>
<td>80 (50.6%)</td>
</tr>
<tr>
<td>26-36</td>
<td>47 (48.4%)</td>
<td>50 (51.5%)</td>
</tr>
<tr>
<td>37-47</td>
<td>34 (48.5%)</td>
<td>36 (51.4%)</td>
</tr>
<tr>
<td>48-60</td>
<td>34 (50.7%)</td>
<td>33 (49.2%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>43 (52.4%)</td>
<td>39 (47.5%)</td>
</tr>
<tr>
<td>Chinese</td>
<td>114 (52%)</td>
<td>105 (47.9%)</td>
</tr>
<tr>
<td>Indians</td>
<td>35 (39.3%)</td>
<td>54 (60.6%)</td>
</tr>
<tr>
<td>Others</td>
<td>1 (50%)</td>
<td>1 (50%)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>87 (48.6%)</td>
<td>92 (51.3%)</td>
</tr>
<tr>
<td>unmarried</td>
<td>106 (49.7%)</td>
<td>107 (50.3%)</td>
</tr>
</tbody>
</table>
Table 5. Association between demographic data and the attitude of participants towards HPV vaccine

<table>
<thead>
<tr>
<th>Attitude towards HPV vaccine</th>
<th>p-value</th>
<th>OR (95% CI) Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>96 (60.8%)</td>
<td>62(39.2%)</td>
</tr>
<tr>
<td>26-36</td>
<td>39 (40.2%)</td>
<td>58(59.8%)</td>
</tr>
<tr>
<td>37-47</td>
<td>38(54.3%)</td>
<td>32(45.7%)</td>
</tr>
<tr>
<td>48-60</td>
<td>35(52.2%)</td>
<td>32(47.8%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>38(46.3%)</td>
<td>44(53.7%)</td>
</tr>
<tr>
<td>Chinese</td>
<td>125(57.1%)</td>
<td>94(42.9%)</td>
</tr>
<tr>
<td>Indians</td>
<td>45(50.6%)</td>
<td>44(49.4%)</td>
</tr>
<tr>
<td>Others</td>
<td>0 (0.0%)</td>
<td>2(100%)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>84 (46.9%)</td>
<td>95(53.1%)</td>
</tr>
<tr>
<td>unmarried</td>
<td>124(58.2%)</td>
<td>89(41.8%)</td>
</tr>
</tbody>
</table>

Table 6. Association between demographic data and the practice of participants towards HPV vaccine

<table>
<thead>
<tr>
<th>Practice towards HPV vaccine</th>
<th>p-value</th>
<th>OR (95% CI) Adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-25</td>
<td>27(17.1%)</td>
<td>131(82.9%)</td>
</tr>
<tr>
<td>26-36</td>
<td>38(39.2%)</td>
<td>59(60.8%)</td>
</tr>
<tr>
<td>37-47</td>
<td>45(64.3%)</td>
<td>25(35.7%)</td>
</tr>
<tr>
<td>48-60</td>
<td>32 (47.8%)</td>
<td>35(52.2%)</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>40(48.8%)</td>
<td>42(51.2%)</td>
</tr>
<tr>
<td>Chinese</td>
<td>55(25.1%)</td>
<td>164(74.9%)</td>
</tr>
<tr>
<td>Indians</td>
<td>46(51.7%)</td>
<td>43(48.3%)</td>
</tr>
<tr>
<td>Others</td>
<td>1(50.0%)</td>
<td>1(50.0%)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>90(50.3%)</td>
<td>89(49.7%)</td>
</tr>
<tr>
<td>unmarried</td>
<td>52(36.6%)</td>
<td>161(75.6%)</td>
</tr>
</tbody>
</table>

Overall Discussion

Up to 95.9% of respondents have heard about cervical cancer, this results is slightly lower when compare to one similar study conducted in Eastern Uganda. Response for questions assessing knowledge of respondents on risk factors and signs and symptoms of cervical cancer was fairly optimal, up to 82.1% and 82.4% of respondents knows that women with cervical cancer would get bleeding in between periods.
and periods would be heavier and longer duration, respectively. Similar trend can be observed in Mukama et al. report. In addition, 355 individuals out of 392 respondents answered correctly that cervical cancer can be prevented by cervical cancer vaccination. However, less than half respondents (46.9%) do not know that early sexual intercourse increased cervical cancer risk, which are reported differently from Mukama et al. Knowledge towards the course of cervical cancer vaccination, protection duration provided by a full HPV vaccination course, national immunization program beneficial group and vaccination cost are reported to be low. Only 17.1% (67 individuals out of 392 respondents) know the beneficial age range for free HPV vaccination; while only 20.4% of them know the correct protection duration a completed vaccination course provide. 94.1% of the respondents do not know about the cost of a HPV vaccination course. Nonetheless, the level of knowledge of recruited populations are said to be good. 94.6% of the respondents scored in between 10-14 marks. There are lack of similar studies targeting general public done in Malaysia. However, similar studies which respondents are healthcare providers or healthcare degree students, such as HeshamRashwan et al. and Maharajan et al. reported a good level of knowledge on cervical cancer vaccination.

Overall, slightly more than half of the respondents (53.1%) scored poorly. 86.2% respondents agreed that they would get vaccinated if they are at a high risk in getting cervical cancer regardless the price of vaccines and 95.2% of them would get vaccinated if it is recommended by their physician. This coupled with several studies that suggest recommendation and recognition of HPV vaccination are utmost important factor affecting the vaccination uptake rate. Physicians’ role in future HPV vaccination promoting event should be taken care and maximize. Good attitude was observed when 332 individuals out of 392 respondents (84.7%) stated that they would get vaccinated if they get a free offer for a full course of vaccination.

It is found that respondents from Klang valley have a poor level of practice, with 255 individuals (65.1%) score 4 and below. Only 38.5 percent of respondents had been vaccinated within the optimum age range from 9 years of age to 26 years of age. This low vaccination rate (38.5%) is similar in studies reported by Yam et al. (23.4%) .

**Conclusion**

Age group, marital status, education level and employment status are found to be the factors affecting the KAP levels of Malaysia women, as these socio-demographic characteristics showed significant relationship with the dependent variables (KAP). Logistic correlation analysis also show the correlation between knowledge, attitude and practice levels in terms of HPV vaccination. Despite a good level of knowledge, poor attitude and practice indicate room of improvements for promotion of HPV vaccination. Effective measures are to be taken by efforts contributing from different professions. It is utmost important task to close the gap in between knowledge with attitude and practice so that the HPV protection provided by cervical cancer vaccines can eliminate the high cervical cancer rate among Malaysian women.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

Body Dissatisfaction and Risk of Eating Disorder among UCSI University Non-Science Field Students

Joyce Tan Xi Jie1, Shashikala Sivapathy1

1Faculty of Applied Sciences, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract

Body dissatisfaction and risk of eating disorder are problems that are continuing to trouble a large proportion of women and a growing number of men. This study aims to determine the relationship between socio-demographic factors (age and gender), body mass index, body dissatisfaction and risk of eating disorder among UCSI university non-science field students. A self-administered questionnaire which contains four sections was used, including background information, anthropometric measurements, Figure Rating Scale and Eating Attitude Test-26. A cross-sectional study was conducted among a sample of 375 Malaysian students (48.8% males and 51.2% females) between the age of 17 to 28. In this study, there were no significant differences in gender on age (t = 1.626; p > 0.05) and BMI status (t = 1.813; p > 0.05). Also, there was no significant difference found in the total mean score of EAT-26 (t = -1.927; p > 0.05) between genders. However, a significant difference was found in the dieting subscale (t = -2.694; p < 0.05) in which females scored significantly higher than that of males. On the other hand, body dissatisfaction among female students was showed significantly higher than that of males (t = -9.262; p < 0.001). Aside from that, a positive correlation (r = 0.120; p < 0.05) was found between body dissatisfaction and risk of eating disorder. Thus, more adapted interventional programme and a more in-depth studies relating these factors are crucial in order to correct the body image misperceptions among university students and to decrease the occurrence of risk of eating disorder.

Keywords: Body mass index; eating disorder; man; woman.

Introduction

Body dissatisfaction and risk of eating disorder are problems that are continuing to trouble a large proportion of women and a growing number of men. Body dissatisfaction is defined as a person’s negative thoughts or feelings about their body and it has been found to be prevalent around the globe. Whereas, risk of eating disorder is the risk of engaging in eating behaviors that are associated with psychological distress and physical ill-health but are not of a severity to warrant a clinical eating diagnosis. In addition, irregular eating behaviors are extreme dieting, excessive exercising, binge eating, self-induced vomiting, use of laxative and diet pills, as well as negative body image.

The risk of eating disorder is alarmingly prevalent in this modern society and has been getting a great deal of attention. The risk of eating disorder also plays a particularly important role as the most common indicators for the development of an eating disorder. According to obsessive, irregular or chaotic eating behaviors are also belongs to the category of at risk of eating disorder, especially when a person’s life experiences a level of discomfort or disruption. In addition to that, body dissatisfaction was also found as a well-replicated risk factor for the onset of eating disorder, yet not all individuals with body dissatisfaction were at risk of eating disorder.

In 2013, Forney pointed out that body dissatisfaction prospectively predicts worsening risk of eating disorder among young adults in university population. A recent study conducted in Taiwan among the female undergraduates showed that more than one third (43.2%) of the college women were engaging in unhealthy and

Corresponding author:
Shashikala Sivapathy
E-mail: shashikala@ucsiuniversity.edu.my

DOI Number: 10.5958/0976-5506.2019.00863.5
irregular eating behaviours. However, Uzun et al. has proven that 17.1% of the Turkish female college women were identified as at risk of eating disorder.

According to Mitchell and Mazzeo, the relationship between body dissatisfaction and risk of eating disorder has not been sufficiently explored among young adults. Many of them have spent a lot of time to improve their body shape and body weight by engaging in unhealthy eating habits in order to adapt to the trend of thin-culture society. This will eventually lead most of them to be at risk of eating disorder.

Besides, previous researches were conducted mostly among adolescence, especially among females. Only a small amount of studies included males as their study subjects. In addition to that, a majority of the studies were conducted in the Western cultures and only a few studies were done in Asia. This results in a lack of published information on the relationship between risk of eating disorder and body dissatisfaction among Malaysia private university students.

In present study, both males and females will be included as participants. This reason is that recent studies have revealed that at risk of eating disorder was not only a problem for females but also a problem encountered by males. As there is a lack of published information on at risk of eating disorder and body dissatisfaction among young adults, this study was conducted to determine the relationship between socio-demographic factors (age and gender), body mass index (BMI), body dissatisfaction and risk of eating disorder among UCSI university non-science field students.

Methodology

This study comprised of an analytical cross-sectional study was used as the study design. This study was conducted in South Wing UCSI University, Cheras, in Malaysia which is a private university. Convenience sampling method was used in this study. The following formula was used as the sample size calculation for the prevalence of at risk of eating disorder and body dissatisfaction among private university students in Malaysia. Thus, a total sample of 377 students was required to give the prevalence with its 95% confidence interval. The inclusion criteria of this study was aged 17 to 28 years old, Non-science field students and Malaysian nationality. The exclusion criteria was all science field students, all international students and disabled student. Data collection was conducted from mid-October till mid-November 2013 by using a English language self-administered questionnaire. This questionnaire consists of four parts which include socio-demographic factors, anthropometric measurements, the Figure Rating Scale (FRS) as well as the Eating Attitudes Test-26 (EAT-26). The purpose of using this instrument is to assess the relationship between body dissatisfaction and the risk of eating disorder among UCSI University students. As for data analysis, all the data was analyzed using the Statistical Package for Social Sciences (SPSS) software for Windows version 19.

Result and Discussion

Comparison of Variables between Genders and Age

Table 1 showed the mean values, t-values and p-values for the age between male and female students. From this data, the result showed that most of the students were at the age of 19 years old regardless of gender differences. The present study also showed that both males and females had almost the same mean age value with only a slight difference between them. Aside from that, the result also showed that there was no significant difference between males and females in terms of age (t = 1.626; p > 0.05). This finding is consistent with a previous study. According to the statistics in Canada proposed by Dale. The average age of a majority of the students was in their late teens and early 20s. Besides that, Sheldon also proposed that adolescents and young adults are the most vulnerable group to be at risk of developing eating disorder, regardless of gender differences.

<table>
<thead>
<tr>
<th></th>
<th>Mean Value</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>19.86 ± 1.56</td>
<td>1.626</td>
<td>0.105</td>
</tr>
<tr>
<td>Female</td>
<td>19.60 ± 1.52</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at p < 0.05

Comparison of Variables between Genders and Body Mass Index

Table 2 showed the results from the analysis of independent sample t-test in BMI between male and female students. The result showed that the mean BMI
values for both males and females were almost the same, with males slightly higher than that of females. This finding is consistent with a study in Malaysia conducted by Kuan et al.\textsuperscript{17}. Aside from that, the results also showed that there was no significant difference between males and females in the BMI value (t = 1.813; p > 0.05) although males had a higher mean BMI value than females. This finding is supported by Kruse\textsuperscript{18}, which also found that there was no statistically significant difference in BMI by gender.

**Table 2. Independent sample t-test for BMI (n=375).**

<table>
<thead>
<tr>
<th></th>
<th>Mean Value</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>21.88 ± 3.57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>21.17 ± 4.01</td>
<td>1.813</td>
<td>0.071</td>
</tr>
</tbody>
</table>

*Significant at p < 0.05

Comparison of Variables between Genders and Body Dissatisfaction

Table 3 showed the mean values, t-values and p-values for the current body size, ideal body size and the discrepancy score between male and female students. It was showed that male students had a larger current body size than female students. Besides, the results also showed that males had a higher mean value in ideal body size than females. Nevertheless, females showed a higher mean value in the discrepancy score. One of the reason may be due to females nowadays like to compare themselves to thin media images and sometimes they compare themselves to peers who are more relevant\textsuperscript{19}.

Generally, there were no differences in response to the items between male and female students. From the analysis of independent sample t-test, the differences in the current body size between males and females was not significant (t = 0.992; p > 0.05). However, there was a statistically significant differences for the ideal body size between male and female students in which males were statistically significantly higher than female students (t = 18.909; p < 0.05). This clearly indicated that males preferred a larger body size and females preferred a smaller body size as compared to their current body size. This finding is consistent with a previous research conducted by Baugh\textsuperscript{20}. Aside from that, the results also showed that there was a statistically significant difference between males and females in the discrepancy score, in which females was statistically significantly higher than that of males (t = -9.262; p < 0.05). This finding is supported by Prevos\textsuperscript{21}.

**Table 3. Independent sample t-test for body dissatisfaction (n=375)**

<table>
<thead>
<tr>
<th></th>
<th>Mean Value</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3.86 ± 1.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>3.72 ± 1.21</td>
<td>0.992</td>
<td>0.322</td>
</tr>
<tr>
<td>Current Body Size</td>
<td>4.15 ± 0.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ideal Body Size</td>
<td>21.17 ± 4.01</td>
<td>18.909</td>
<td>0.000*</td>
</tr>
<tr>
<td>Discrepancy score</td>
<td>-0.29 ± 1.62</td>
<td>-9.262</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*Significant at p < 0.05

Comparison of Variables between Genders and Risk of eating disorder

Table 4 demonstrated the mean values of the EAT-26 score among males and females. The result indicates that female students had a higher EAT-26 score than male students. Besides that, the independent sample t-test showed that there was significant difference between genders in the dieting subscale (t = -2.694; p < 0.05). However, the independent sample t-test showed that there was no significant difference between the scores of male and female students on EAT-26 score in which the mean EAT-26 score in female students was statistically significantly higher than that of male students (t = -1.927; p > 0.05). Also, there was no significant difference between genders in the bulimia and food preoccupation subscale (t = -1.153; p > 0.05) as well as the oral control
This finding is supported by Nasir\textsuperscript{13} which also found that there was no sex difference the mean EAT-26 score. Similarly, Edman and Yates\textsuperscript{22} also showed no gender difference in the development of risk of eating disorder among Malaysian college students. However, this finding showed that there is inconsistency with a study done by Abbate-Daga et al.\textsuperscript{21}, which also showed that females were more vulnerable to be at risk of eating disorder. Besides that, Tan and Yew\textsuperscript{12} also found significant differences between males and females in the mean scores of EAT-26.

Table 4. Independent sample t-test for risk of eating disorder (n=375)

<table>
<thead>
<tr>
<th>EAT-26 score</th>
<th>Mean Value</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Dieting</td>
<td>5.15 ± 5.55</td>
<td>6.79 ± 6.23</td>
<td>2.694</td>
</tr>
<tr>
<td>Bulimia and food preoccupation</td>
<td>1.73 ± 2.53</td>
<td>2.05 ± 2.82</td>
<td>1.153</td>
</tr>
<tr>
<td>Oral control</td>
<td>2.91 ± 3.06</td>
<td>2.81 ± 3.31</td>
<td>0.303</td>
</tr>
<tr>
<td>Total</td>
<td>9.79 ± 8.88</td>
<td>11.65 ± 9.80</td>
<td>1.927</td>
</tr>
</tbody>
</table>

*Significant at p < 0.05

Relationship between Variables

Table 5 presented the relationship between age, BMI, body dissatisfaction and risk of eating disorder. From the table, there was no significant relationship between age and risk of eating disorder ($r = -0.028$, p = 0.592).

A non-significant relationship was found between BMI and risk of eating disorder ($r = -0.008$, p = 0.871). This finding showed inconsistent with a previous research by Martin et al.\textsuperscript{24}, which found that high BMI was associated with risk of eating disorder.

Aside from that, the relationship between body dissatisfaction and risk of eating disorder was also found to be significantly positively related ($r = 0.120$, p = 0.021). This indicated that the more an individual feels body dissatisfaction, the higher the tendency of an individual to be at risk of developing an eating disorder. This is because when a person was dissatisfied with their own body shape, he or she will try to change his or her body shape which may eventually lead to unhealthy practices with food and thus may cause that person to be at risk of developing eating disorder.

Besides, this finding is also consistent with another research which showed that body dissatisfaction was found to be frequently associated with the tendency to be at risk of eating disorder\textsuperscript{12}. Furthermore, the present study showed consistency with past research done by Jonstang\textsuperscript{25}, where a positive relationship was found between FRS and EAT-26 among university students. The occurrence of this phenomenon is due to the stereotypes and standards that has been reinforced by the media that put pressure on most of the young adults and cause them to engaged in draconian diet which can cause harmful effect to their health.

Similarly, Tylka\textsuperscript{26} also revealed that body dissatisfaction can lead an individual to be at risk of eating disorder regardless of gender differences. The possible reason that may explain this finding is due to the changes of body image perception which may lead to a decrease in body satisfaction among university students. At the same time, these changes may also contribute to cause the occurrence of unhealthy eating behaviours. Hence, individual who adapted body dissatisfaction are at increased risk of developing an eating disorder.

Table 5. Relationship between age, BMI, body dissatisfaction and risk of eating disorder (n=375)

<table>
<thead>
<tr>
<th>Risk Eating Disorder</th>
<th>Correlation Coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.028</td>
<td>0.592</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.008</td>
<td>0.871</td>
</tr>
<tr>
<td>Body dissatisfaction</td>
<td>0.120</td>
<td>0.021*</td>
</tr>
</tbody>
</table>

*Correlation is significant at p < 0.05.
Conclusion

The main objective of this study was to determine the relationship between socio demographic factors, body mass index, body dissatisfaction and risk of eating disorder among UCSI university students. A total of 375 university students participated in this study, with approximately an equal number of males and females. About half of the respondents (51.7%) were currently pursuing foundation and degree in Business and Information Science, followed by Social Sciences and Liberal Art (48.3%). The results also reported that there were no significant relationship between age and risk of eating disorder. In this study, the results reported that BMI between males and females did not differ significantly. Also, the results showed that no significant relationship were found between BMI and risk of eating disorder. In terms of body dissatisfaction, the result also showed that most students were dissatisfied with their own current body size regardless of gender differences. In the discrepancy score section, the results showed that females had significantly higher scores as compared to males. However, the results also showed that a significantly positive relationship was found between body dissatisfaction and risk of eating disorder. Furthermore, findings reported that most of the students had a low level of concern about their body weight, body shape and eating. The results showed no significant difference was found in the mean EAT-26 score between genders. However, a significant difference was found in dieting subscale between genders with females having a significantly higher score than that of males.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

Knowledge, Awareness and Perception of Healthcare Personnel Based on Employment Level towards Stem Cells in Pahang

Abu Mansor Noor Azizah1, Ahmad Bustami Normina1, Marjan Sadat Seghayat1, Chung Keat Tan1, Eugenie Sin Sing Tan1, Farahnaz Amini1, Sharmanee Thiagarajah1
1Faculty of Medicine and Health Science, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract

Stem cell research and treatment hold much promise and expectation both globally and locally to date with a lot of interest garnered. The aim of this survey was to assess their knowledge, awareness and perception towards stem cells based on their employment level, as well as insight on healthcare personnel's acceptance of stem cells from religious and moral point of views and the support on the treatment and research. A cross-sectional tool was used on 307 healthcare personnel in Pahang, Malaysia was conducted by using cluster random sampling from six primary healthcare clinics. Ethical approval (NMRR-14-1052-21256) was granted from Malaysian Research & Ethics Committee, Ministry of Health, Malaysia and UCSI Ethics Committee. Based on the result, knowledge on the stem cell among respondents associated with education (p=0.000). Recognizing the low learning in foundational microorganism, the members demonstrated enthusiasm for undifferentiated cell data extremely significant with p < 0.01. The association of awareness on impact of religious and ethical belief over storing and using stem cells for research or therapy among respondents by both education and employment status have very significant p value < 0.01. Overall, the perception of the healthcare personnel based on education to support on stem cell research, in willingness to use medical treatments from embryonic stem cells, using excess embryo during IVF, tax contribution for stem cell research in Malaysia were very significant with p value < 0.01. Taking everything into account, this investigation reflects low level of information, mindfulness and impression of social insurance work force dependent on their business status on the of perspectives relating to undeveloped cells in Malaysia.

Keywords: Stem cell; awareness; knowledge; perception; healthcare.

Introduction

Cells, have been once a study and research mainly in biological and pharmaceutical field. The remarkable evolution embarked the creation of paradigm shift in medical field since the first bone marrow transplants in the 1960s and the isolation of embryonic stem cells from mice in the 1980s followed by many other cell based therapies exclusively stem cell treatment and research has taken place last few decades1.

Organ and tissue donors has always been critically insufficient to supply and replace damaged or dysfunctional part and even then, the compatibility with recipient in another challenge2. The rise of number mortality and morbidity in terminal diseases and degenerative body parts due to the loss or failure of specific cell types function also have been the key for the stem cell field expansion.

Stem cells is one of the main component in regenerative medicine, apparently provide a renewable source for transplantation, and alternative therapies for a multitude of damaged organs as well as many other medical conditions. Accumulated evidences in clinical trials shown there are realistic possibilities with technologies stretching to optimization of stem cells therapies to improve life quality and solve age related factors in near future3.

Corresponding author:
Chung Keat Tan
sharmanee@ucsiuniversity.edu.my
Stem cells have the ability to self-renew and potential to give rise as specialized cell types. Based on their degree of plasticity, versatility and tissue origin, stem cells have been classified into diverse specialized cell types. The stemness can be categorized in the degree of plasticity from the highest of totipotent, pluripotent, multipotent, oligopotent and unipotent which relatively expressed potential to generate the variety of cell lineages to the lowest. Generally, stem cells come from two main sources whereby embryos formed during the blastocyst phase have encompass embryonic stem cells; ESC and adult tissue have adult stem cells, while induced pluripotent stem cell known as iPSCs are synthetically stimulated to ‘induce’ pluripotency from the somatic cells, besides all these resources able to give rise to cancer stem cells too.

Despite its great potential and high demands, stem cells are surrounded by various social, ethical and legal issues which are shared by stem cell scientists’ globally.

Future impact of stem cells is inevitable, right knowledge especially among healthcare personnel is important as they act as pivotal in educating and disseminating reliable health information where public are confident in the validity. Widespread of information to the public could aid informed decision making and eases comfort with the new technology so as to overcome public misperceptions about stem cell and the research and its social implications. As such, this study aims to determine the level of knowledge, awareness and perception of stem cell among health care personnel in Malaysia based on their employment level. This was done to evaluate the views of each health personnel based on their work experience and employment status.

**Methodology**

A cross-sectional questionnaire was conducted at five major medical clinics in Pahang, Malaysia. Location of sampling are: 3°51’22.8”N, 103°21’57.1”E, 3°49’11.8”N, 103°19’24.6”E, 3°47’20.6”N, 103°14’19.0”E, 3°49’28.6”N, 103°17’13.8”E and 3°45’12.7”N, 103°12’15.2”E. A total of 307 healthcare personnel comprising of doctors, nurses, medical assistants, pharmacists, assistant pharmacists, laboratory technicians, radiographers, dieticians, physiotherapists, occupational therapists and attendants were recruited. Written permission for sampling was obtained from Kuantan District Medical Officer. In addition, ethical approval (NMRR-14-1052-21256) was granted from Malaysian Research & Ethics Committee, Ministry of Health, Malaysia and UCSI Ethics Committee. The questionnaire composed of four sections; demographics (9 items), awareness (11 items), knowledge (17 items) and perception (7 items). All documentations were available in English and Bahasa Melayu (Malaysia’s national language). Translation were verified by professional linguistics of postgraduate qualification.

The data collected were analyzed using SPSS (Statistical Package for Social Studies) version 21. The main statistical analysis was descriptive. The level of significance was set at p < 0.05 and confidence interval = 95% and Chi-square test was used for statistical tests.

**Result and Discussion**

**Knowledge of Healthcare Personnel towards Stem Cells**

Level of knowledge regarding stem cell in general, and their source of information were evaluated. Figure 1 showed none had level of knowledge at the scale of 5 while nearly 40% comprised in scale 3 and 4 while the rest 60% of participants were in scale of 1-2.

![Figure 1. Level of knowledge on stem cells (n=307)(Scale of 1=poor to 5=excellent)](image-url)

However based on the association of respondents who have heard information on stem cells by education level were very significant with p <0.01. Similarly, the association of respondents knowledge on the use of adult stem cell by education level were very significant with p <0.01

Almost 227 (92%) female participants had claimed that they have heard of stem cell from various sources. Notably heard from mass media/internet with 70.7%, followed by cosmetic products with 49.5%, while information from medical healthcare professional and
pharmacy which are more reliable had only 44.3% altogether.

On the type of stem cell sources, participants were more familiar of umbilical cord blood stem cells with having 78.8%, followed by adult human tissue with 53.1%. Only 21.2% of participants have heard of foetal tissue as a source of stem cell. However, based on the Table 1 and Table 2 analysis, the interest of knowledge on stem cell among respondents based on two criteria which were gender, and employment status were statistically very significant with p<0.01.

Table 1. Interest in knowledge on stem cell among respondents by gender (n=307)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Interest in knowledge on stem cell n (%)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Not sure</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>42(70)</td>
<td>11(18.3)</td>
<td>7(11.7)</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>180(72.9)</td>
<td>17(6.9)</td>
<td>50(20.2)</td>
<td>247</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>222(72.3)</td>
<td>28(9.1)</td>
<td>57(18.6)</td>
<td>307</td>
<td></td>
</tr>
</tbody>
</table>

X²=42.072,  p= 0.001

Table 2. Interest in knowledge on stem cell among respondents by employment status (n=307)

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Interest in knowledge on stem cell n (%)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Not Sure</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>39(86.7)</td>
<td>0</td>
<td>6(13.3)</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Staff Nurses</td>
<td>101(80.2)</td>
<td>9(7.1)</td>
<td>16(12.7)</td>
<td>126</td>
<td></td>
</tr>
<tr>
<td>Medical Assistants</td>
<td>14(60.9)</td>
<td>4(17.4)</td>
<td>5(21.7)</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Pharmacists</td>
<td>29(59.2)</td>
<td>10(20.4)</td>
<td>10(20.4)</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Radiographers</td>
<td>6(54.5)</td>
<td>2(18.2)</td>
<td>3(27.3)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Dietitians</td>
<td>1(33.3)</td>
<td>1(33.3)</td>
<td>1(33.3)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>14(82.4)</td>
<td>0</td>
<td>3(17.6)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>8(72.2)</td>
<td>1(9.1)</td>
<td>2(18.2)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Occupational Thera</td>
<td>1(33.3)</td>
<td>0</td>
<td>2(66.7)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Attendants</td>
<td>9(47.4)</td>
<td>1(5.3)</td>
<td>9(47.4)</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>222(72.3)</td>
<td>28(9.1)</td>
<td>57(18.6)</td>
<td>307</td>
<td></td>
</tr>
</tbody>
</table>

Awareness of Healthcare Personnel towards Stem Cells

There is no significant association between potential therapeutic applications using stem cells and education level (p= 0.256). However, level of awareness is significantly dependent on education level for both in the doubt of stem cells presence in the commercialized health or cosmetic products (p = 0.006) and stem cell research in Malaysia (p=0.016).

The awareness of the presence of cord blood banking in Malaysia was significantly higher among doctors and medical laboratory technologist compared to others (p=0.000), while the source of information on cord blood banking that the participants chose were mainly from the internet with 37.8% and medical personnel with 29.3%.

There were more than two-third (67.8%) of participants were unsure whether to choose public or private bank for stem cell storage; 17.9 % chose public bank and 14.3% chose private bank. It was found that the main reasons for choosing public bank for stem cell storage were as donation for those in need it with 32.6% followed by for research use with 24.8%. Main reasons in choosing private bank was found with 34.5% participants felt having own cord blood stem cell would be safer and 22.8% participants felt that it is good investment in case if needs.
The p values were very significant among the healthcare personnel’s awareness on the impact of religious and ethical belief over storing and using stem cells for research or therapy by both education level and employment status having p value < 0.01 as shown Table3.

Table 3. Awareness on impact of religious and ethical belief over storing and using stem cells for research or therapy among respondents by employment status (n=307)

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Awareness on impact of religious and ethical belief (%)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Not Sure</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>1(2.2)</td>
<td>23(51.1)</td>
<td>21(46.7)</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Staff Nurses</td>
<td>20(15.9)</td>
<td>26(20.6)</td>
<td>80(63.5)</td>
<td>126</td>
<td></td>
</tr>
<tr>
<td>Medical Assistants</td>
<td>0</td>
<td>3(13)</td>
<td>20(87)</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Pharmacists</td>
<td>6(12.2)</td>
<td>14(28.6)</td>
<td>29(59.2)</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Radiographers</td>
<td>0</td>
<td>0</td>
<td>11(100)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Dietitians</td>
<td>1(33.3)</td>
<td>0</td>
<td>2(66.7)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>2(11.8)</td>
<td>3(17.6)</td>
<td>12(63.7)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Physiotherapists</td>
<td>1(9.1)</td>
<td>3(27.3)</td>
<td>7(63.6)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Occupational Thera</td>
<td>1(3.3)</td>
<td>0</td>
<td>2(66.7)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Attendants</td>
<td>2(10.5)</td>
<td>3(15.8)</td>
<td>14(73.7)</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34(11.1)</td>
<td>75(24.4)</td>
<td>198(64.5)</td>
<td>307</td>
<td></td>
</tr>
</tbody>
</table>

\(X^2=39.629, \ p=0.002\)

Perception of Healthcare Personnel towards stem cells

Overall, the perception of health personnel towards stem cell in this survey have shown very significant finding based on their education level compared to religious level, where education acts as vital role not only disseminating current information but also in comprehending the stem cell in the healthcare. Support for stem cell research among participants based on education level had very significant value with \(p < 0.01\). Health personnel who participated from various level background, also gave very significant value of perception in willing to use embryonic stem cells for medical treatments as well as using excess embryo during IVF for stem cell research in Malaysia based on education level with both having p value < 0.01. However perception on using excess embryo during IVF for stem cell research in Malaysia among respondents based on religion had no significant value, \(p = 0.676\). Also, perception on need of specific legislation and tax contribution for stem cell research in Malaysia among the participants by education showed very significant value with both having \(p\) value < 0.01.

Overall Discussion

Stem cell and its immense potential soon will revolutionize the field of science and especially medicine. However, stem cell-based products have yet to use as main treatment as there are many still at clinical trials studies and FDA has approved only stem cell-based product consist of blood-forming stem cells derived from cord blood and bone marrow. Though many studies have been done in other countries to assess public attitude on stem cells, there is not many study as yet carried out in Malaysia8-11.

Out of 307 participants, 90.9% and mostly females (91.9%) claimed that they have heard about stem cell which mainly from mass media/internet (70.7%) and cosmetic products (49.5%). Marketing via online and manipulating stem cell as seller name over the product especially in cosmetics is a gimmick played by many commercial industries without any or much evident based12,13. As far as mass media and internet in the era of 4th Industrial Revolution are concerned, both contribute to the most effective role in dissemination information. A period which is distinct in the speed, scale and energy at which it transforms production, distribution and consumption. As anticipated, it followed by 38.1%
participants received the information on stem cells from medical health care professional. The response rate for “yes” was more than 80% in all group of employment status except among attendants (73.3%) and statistically significant by education level (p=0.002). Undoubtedly, education level as well employment status almost always play important role in accessing the knowledge.

In the past, hardcopy scientific journals or published articles had been the main sources for scientific information; however, in recent years, the publics are able to obtain the science behind stem cell research easily through the media and internet14, 15.

Among the sources of stem cells, umbilical cord blood was the most popularly heard by the respondents in 78.8%; whereas foetal tissue was not much heard as a source of stem cell (21.1%). The popularity of umbilical cord is much expected as its preservation has been widely promoted especially in maternity hospitals and multimedia.

In this study the participants rated themselves at level of little (24.1%) to moderate (36.2%) level of knowledge. However, majority of more than 75% of participants gave positive feedback on having interest to know more about stem cells and current status on the medical treatment using stem cells, potential benefits and risks of adult and embryonic stem cell research, religion and ethical consideration of stem cells in Malaysia. Therefore this encouraging result of the participants positively in need for further information they are lacking of should not be neglected. Similar outcomes by Mohammed16 and Katz, et.al17 who found in their study that the respondents from other countries had a similar viewpoint thus the respondents considered that the additional information provided by the healthcare professionals was insufficient which this crucial additional information was needed. In terms of occupation, specialists (100%), doctors (86.7%), medical laboratory technician (82.4%) and 80% staff nurses had greater interest in knowledge on stem cells compared to others. Again, employment status further suggesting that education and exposure are the key to cultivate more interest and inquisitive in stem cell with p<0.01.

Many profit driven companies have been manipulating the insignificant data to sell the so-called “stem cells” in their products which claimed to treat many medical condition. Popularly in recent years the exploitation of stem cells in cosmetic and healthcare products that could help to rejuvenate their skin and make them look younger is incredible18. Obviously, female population are easily intrigued by the products and become the victims of their false claim. In contrary, this survey showed that there was a statistically significant majority of respondents who did not have high belief in the presence of stem cells in those products (p=0.006). The level of awareness significantly dependent on education level for both in the doubt of stem cells presence in the commercialized health or cosmetic products and stem cell research in Malaysia with p value < 0.01.

Conclusion

As a summary of the key findings, the results showed that overall the employment status significantly plays a major role in knowledge, awareness and perception on stem cells of health care personal at Kuantan, Pahang. Be that as it may, the key findings likewise demonstrated low level of information, mindfulness and recognition on stem cells among healthcare personnel. Thus, the health care personals have to be well equipped with awareness and knowledge on stem cell by regular exposure to key updates in their field of work. Thus it can be concluded that regardless on the level of education, the knowledge and exposure on stem cell among health personal has to be improved significantly.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

Emotional Intelligence As A Mediator Between Personality and Happiness Among Adolescents In Malaysia

Sim MS\textsuperscript{1}, Mohtaram R\textsuperscript{1}

\textsuperscript{1}Department of Psychology, Faculty of Social Sciences and Liberal Arts, UCSI University Kuala Lumpur, 56000 Cheras, Kuala Lumpur, Malaysia

Abstract

Adolescent stage is a duration whereby an individual experiences gradual changes physically and emotionally from childhood to adulthood. During this stage, they will encounter a lot of challenges, ambiguities, obligations, expectations and influences which may affects them emotionally and make them feel unhappy. Individuals who are not happy are more likely to experience severe mental illness and other serious psychological issues that may affect their functioning in the form of social, cognitive and emotional. Present study was carried out to determine the role of emotional intelligence as a mediator between personality and happiness among adolescents in Malaysia. 384 adolescents (13 to 17 years old) from four private institutions were selected as the respondents of this study. The data collected with using Goldberg’s International Personality Item Pool (IPIP) Big-Five Factor Marker, Schutte Self-Report Emotional Intelligence Test (SSEIT) and Oxford Happiness Questionnaire (OHQ). Emotional intelligence partially mediates extraversion and conscientiousness to happiness, and fully mediates agreeableness and neuroticism to happiness. However, emotional intelligence does not mediate openness and happiness. All the Big Five personality, except for openness were significantly correlated to happiness. A significant correlation was found between personality and emotional intelligence. Lastly, emotional intelligence is positively correlated to happiness. Emotional intelligence does play a role in mediating personality and happiness. In order to come out with a more comprehensive and informative outcome, future researcher should replicate this study by using various assessments when evaluating an individual’s happiness for their study.

Keywords: Emotional intelligence; adolescents; happiness; personality

Introduction

There is a worrying trend in mental health issue worldwide and Malaysia is not excluded from this issue. It has been predicted that by 2020, the mental health illness will overtake cardiovascular disease as the second contributing factor that affect the Malaysians’ health\textsuperscript{1}. This can be seen from the increase in number of cases recorded in Malaysia, from 10.7\% in 1996 to 29.9\% in 2015\textsuperscript{5}. Out of 10 Malaysians, four is suffering from mental illness\textsuperscript{5}. Children, especially students, are not excluded from this issue where 12.1\% of 5 to 15 years old children and 29.2\% of individuals who are 16 years old and above were reported to have mental health issues\textsuperscript{6,7}. Students who are depressed have greater suicidal ideation (55.8\%) as compared to students who are not depressed (14.4\%)\textsuperscript{8}. According to the Institute for Public Health\textsuperscript{7}, the high suicide risk group in Malaysia are the individuals aged between 16 to 25 years old as they are most vulnerable to attempt suicide\textsuperscript{9,10}. In the early to mid-development of adolescents, the brain experiences neurological development which encourage transition among the connectivity of various brain sections. The prefrontal cortex is associated with strategizing, problem-solving, and tasks execution\textsuperscript{7}. In view of the worrying trend in mental health issues among Malaysians, it is crucial to have an understanding of the factors that affect individual’s happiness in Malaysia.

Among the mental health issues, researchers\textsuperscript{8-10} have consistently found out that the primary element which lead to depression and suicide are feelings of extreme unhappiness. Individuals who are not happy are more likely to experience severe mental illness and other serious psychological issues that may affect...
their functioning in the form of social, cognitive and emotional\textsuperscript{8-12}.

Happiness is defined by Lyubomirsky\textsuperscript{13} as the feeling of joy, satisfaction or positive affect which come together with a sense of good and meaningful life. A happy individual is able to excel in the workplace as they tend to have better work achievements, organizational citizenship, and are more productive\textsuperscript{14}. When talking about a students’ life factors that usually contributes to their happiness would be academic achievement, satisfying facilities of schools, quality of teachers, teaching methods and development of friendship\textsuperscript{15,16}. People who are more inclined towards personality traits such as extraversion, conscientiousness, agreeableness and emotional stability will experience more constant positive emotions, less recurrent negative emotions and greater life satisfaction\textsuperscript{17-21}.

In recent years, the importance of emotional intelligence (EI) has been reiterated in the dispositional explanations of happiness. Emotional intelligence is the subdivision of social intelligence\textsuperscript{22}. An individual with emotional intelligence are always happy, confident, feel contented with their lives and more likely to think positively\textsuperscript{23}. Emotional intelligence enables a person to be aware of their emotion and govern it in a way which encourages well-being and happiness\textsuperscript{24}.

Most of the past findings have examined on the personality\textsuperscript{12, 25} and emotional intelligence\textsuperscript{26-28} aspects as a direct factor that affect happiness. However, very little has focus on how emotional intelligence play a role in mediating the relationship between personality and happiness. In addition, most of these studies\textsuperscript{26,28,25} were done in the western context rather than in Malaysia. Thus, there is not enough studies to imply the role of emotional intelligence in the relationship between personality and happiness in Malaysia context. Besides, past studies\textsuperscript{12, 29} also do not solely target adolescent as their sample population, therefore, more studies are needed in adolescent stage. Adolescent stage is a duration whereby an individual experiences gradual changes physically and emotionally from childhood to adulthood\textsuperscript{4}. During this stage, they will encounter a lot of challenges, ambiguities, obligations, expectations and influences which may affects them emotionally and make them feel unhappy. Hence, to fill up the research void, present study aims to investigate on how emotional intelligence mediates the relationship between personality and happiness among Malaysian adolescents.

\textbf{Methodology}

The research method carried out in this study is quantitative research with the purpose to examine the role of emotional intelligence as a mediator between personality and happiness among adolescents in Malaysia. The correlational design has been used to collect data.

The first of the three instruments used is Goldberg’s International Personality Item Pool (IPIP) Big-Five Factor Marker\textsuperscript{30}, it is used to examine an individual’s personality in the five domains, namely Openness to experience (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Neuroticism (N). A high internal consistency was shown in all of the five domains, for instance, 0.79 (Openness to Experience), 0.81 (Conscientiousness), 0.87 (Extraversion), 0.79 (Agreeableness) and 0.88 (Neuroticism)\textsuperscript{31}.

The second instrument that was used is Schutte Self-Report Emotional Intelligence Test (SSEIT)\textsuperscript{32}, it is used to measure emotional intelligence in the three areas namely, perception of emotions, management of emotions and employment of emotions. SSEIT had a high internal consistency of 0.90 and a high test-retest reliability of 0.87. According to Bastian, Burns and Nettelbeck\textsuperscript{33}, SSEIT has a high convergent and divergent validities.

Lastly, the third instrument that was used is Oxford Happiness Questionnaire (OHQ). This instrument is used to measure an individual’s level of happiness. The internal consistency of OHQ is high which is 0.91\textsuperscript{34}. Based on Pishva, Ghalehban, Moradi and Hoseini\textsuperscript{35}, OHQ has a good reliability and validity.

According to Department of Statistics Malaysia\textsuperscript{36}, the total population of adolescents (10 to 19 years old) in Kuala Lumpur is approximately 356,300. On average, the number of population between 13 to 17 years old in Kuala Lumpur is approximately 71,260. In this study, Cochran’s formula\textsuperscript{37} has used to determine the sample size. Therefore, total number of 384 adolescents of age 13 to 17 years from four private institutions in Kuala Lumpur has participated in this study. To obtain 384 adolescents as the respondents, convenience sampling was used.
Prior from the data collection, approval was sought from the Department of Psychology of UCSI, the school principals, parents and students. Goldberg’s IPIP Big-Five Factor Markers, Schutte Self-Report Emotional Intelligence Test (SSEIT) and Oxford Happiness Questionnaire (OHQ) were used to assess the respondents. 384 set of questionnaires were distributed to the respondents age 13 to 17 years old from the four private institutions. Statistic Package of Social Science (SPSS) version 21 was used for data analysis.

Result and Discussion

According to table 1, most of the adolescents of age 13 to 17 years old in Kuala Lumpur fall under the category of agreeableness (M=32.19, SD=4.441), followed by conscientiousness (M=30.90, SD=4.357), openness (M=30.85, SD=4.465), extraversion (M=29.71, SD=4.362), and lastly neuroticism (M=29.02, SD=4.801).

The connection between the Big Five identity and satisfaction was explored utilizing Pearson-item minute relationship coefficient as shown in Table 2. The discoveries appeared there was a constructive critic relationship among’s satisfaction and the three elements of identity (Extraversion; r=.248, Agreeableness; r=.280, and Conscientiousness; r=.232, n= 384, p < .05). Neuroticism was found to adversely related to satisfaction, r=-.162, n= 384, p < .05. The discoveries are predictable with the past investigations20, 38, along these lines, the elective theories are upheld.

In Table 3, analyst had led different relapse investigation to break down the impacts of enthusiastic knowledge as a middle person on extraversion and bliss. In stage 1 of the intervention show, the relapse of extraversion on bliss was noteworthy, b=.025, t(382) = 4.994, p<.05. Stage 2 demonstrated that the relapse of extraversion on the middle person, enthusiastic knowledge, was additionally noteworthy, b=.354, t(382) = 2.302, p<.05 The aftereffect of this investigation is steady with Chamorro-Premuzic, Bennett and Furnham’s

Table 1. Mean and Standard Deviation of Subscales for Personality, Emotional Intelligence and Happiness

<table>
<thead>
<tr>
<th>Subscales</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>29.71</td>
<td>4.362</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>32.19</td>
<td>4.441</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>30.90</td>
<td>4.357</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>29.02</td>
<td>4.801</td>
</tr>
<tr>
<td>Openness</td>
<td>30.85</td>
<td>4.465</td>
</tr>
<tr>
<td>Emotional Intelligence</td>
<td>107.97</td>
<td>13.190</td>
</tr>
<tr>
<td>Happiness</td>
<td>3.688</td>
<td>.437</td>
</tr>
</tbody>
</table>

Note: N=384

*: P < .05 level (2-tailed).
**: P < .01 level (2-tailed).

In Table 3, analyst had led different relapse investigation to break down the impacts of enthusiastic knowledge as a middle person on extraversion and bliss. In stage 1 of the intervention show, the relapse of extraversion on bliss was noteworthy, b=.025, t(382) = 4.994, p<.05. Stage 2 demonstrated that the relapse of extraversion on the middle person, enthusiastic knowledge, was additionally noteworthy, b=.354, t(382) = 2.302, p<.05 The aftereffect of this investigation is steady with Chamorro-Premuzic, Bennett and Furnham’s
Therefore, the theory is upheld.

**Table 3. Testing Mediator Effects of Emotional Intelligence on Extraversion and Happiness Using Multiple Regression (N=384)**

<table>
<thead>
<tr>
<th>Testing steps in mediation model</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion →Happiness</td>
<td>.025</td>
<td>.005</td>
<td>4.994</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion →Emotional Intelligence</td>
<td>.354</td>
<td>.154</td>
<td>2.302</td>
<td>.022*</td>
</tr>
<tr>
<td>Testing Step 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Intelligence →Happiness</td>
<td>.017</td>
<td>.001</td>
<td>11.760</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraversion →Emotional Intelligence →Happiness</td>
<td>.019</td>
<td>.004</td>
<td>4.403</td>
<td>.000*</td>
</tr>
</tbody>
</table>

Note: B: Unstandardized Coefficients, SE: Standard Errors, *. P < .05 level (2-tailed).

Moreover, for the Table 4, a different relapse examination was directed by specialist to test the go between impacts of passionate insight on suitability and bliss. In Step 1 of the intercession demonstrate, the relapse of appropriateness on satisfaction was huge, b = .028, t(382) = 5.690, p < .05. Stage 2 demonstrated that the relapse of the appropriateness on the go between, enthusiastic insight, was additionally noteworthy, b = 1.410, t(382) = 10.546, p < .05

**Table 4. Testing Mediator Effects of Emotional Intelligence on Agreeableness and Happiness Using Multiple Regression (N=384)**

<table>
<thead>
<tr>
<th>Testing steps in mediation model</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness →Happiness</td>
<td>.028</td>
<td>.005</td>
<td>5.690</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness →Emotional Intelligence</td>
<td>1.410</td>
<td>.134</td>
<td>10.546</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Intelligence →Happiness</td>
<td>.017</td>
<td>.001</td>
<td>11.760</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreeableness →Emotional Intelligence →Happiness</td>
<td>.004</td>
<td>.005</td>
<td>.899</td>
<td>.369</td>
</tr>
</tbody>
</table>

Note: B: Unstandardized Coefficients, SE: Standard Errors, *. P < .05 level (2-tailed).

Concerning the table 5, scientist had utilized various relapse examination to test the go between impacts of passionate insight on honesty and bliss. In Step 1 of the intervention display, the relapse of principles on bliss was critical, b = .023, t(382) = 4.654, p < .05. Stage 2 demonstrated that the relapse of the uprightness on the middle person, passionate knowledge, was likewise huge, b = .638, t(382) = 4.210, p < .05. It was discovered that passionate knowledge incompletely intervened the connection among reliability and satisfaction among teenagers in Malaysia. This outcome is reliable with Chamorro-Premuzic, Bennett and Furnham’s examination⁴¹, along these lines, the elective theory is upheld.
Table 5. Testing Mediator Effects of Emotional Intelligence on Conscientiousness and Happiness Using Multiple Regression (N=384)

<table>
<thead>
<tr>
<th>Testing steps in mediation model</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness →Happiness</td>
<td>.023</td>
<td>.005</td>
<td>4.654</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness →Emotional Intelligence</td>
<td>.638</td>
<td>.151</td>
<td>4.210</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Intelligence →Happiness</td>
<td>.017</td>
<td>.001</td>
<td>11.760</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscientiousness →Emotional Intelligence →Happiness</td>
<td>.013</td>
<td>.004</td>
<td>2.899</td>
<td>.004*</td>
</tr>
</tbody>
</table>

Note: B: Unstandardized Coefficients, SE: Standard Errors, *. P < .05 level (2-tailed).

In table 6, specialist had run different relapse investigation to test the middle person impacts of enthusiastic knowledge on neuroticism and bliss. A full intercession was found in the model (z = - 4.791, p<.05) through a Sobel test. It was discovered that passionate insight completely interceded the connection among neuroticism and satisfaction among teenagers in Malaysia and findings is steady with the work of [41].

Table 6. Testing Mediator Effects of Emotional Intelligence on Neuroticism and Happiness Using Multiple Regression (N=384)

<table>
<thead>
<tr>
<th>Testing steps in mediation model</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism →Happiness</td>
<td>-.015</td>
<td>.005</td>
<td>-3.205</td>
<td>.001*</td>
</tr>
<tr>
<td>Testing Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism →Emotional Intelligence</td>
<td>-.722</td>
<td>.136</td>
<td>-5.324</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional Intelligence →Happiness</td>
<td>.017</td>
<td>.001</td>
<td>11.760</td>
<td>.000*</td>
</tr>
<tr>
<td>Testing Step 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism →Emotional Intelligence →Happiness</td>
<td>-.003</td>
<td>.004</td>
<td>-.622</td>
<td>.535</td>
</tr>
</tbody>
</table>

Note: B: Unstandardized Coefficients, SE: Standard Errors, *. P < .05 level (2-tailed).

Conclusion

The data obtained from this study is solely based on adolescent’s self-report. Thus, this may lead to the occurrence of social desirability bias which may affect the accuracy of the results. To obtain a non-bias data, future researcher should consider employing various assessments when evaluating an individual’s happiness rather than solely depending on the respondent’s self-report. Future researcher can utilize memory and reaction time assessment, physical evaluation and reports from informant to assess happiness. Besides, this study is correlational in nature, researcher could not explore the causal relationship among the variables and could not examine behaviour over an extended period of time. In order to establish causality, future researcher should carry out a longitudinal study to let the researchers and readers to have an in-depth understanding on the causal
relationship between the variables.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

18. C.J. Soto, J. Pers. 2015;83(45).
Chronic Kidney Disease-Mineral and Bone Disorders Laboratory Profiles in Chronic Haemodialysis Patients

Djoko Santoso1, Nirapambudi Devianto1, Pranawa1, Moh. Yogiantoro1

1Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract
Chronic kidney disease-mineral and bone disorder (CKD-MKD) has describe more clinical syndrome which develops as systemic disorder of mineral and bone metabolism as result of CKD. The study aims to determine chronic kidney disease-mineral and bone disorder laboratory profile in chronic haemodialysis patients in Dr. Soetomo Hospital, Surabaya. The demographic and laboratory data (calcium, phosphorus, intact parathyroid hormone and alkali phosphatase) were collected from 150 chronic haemodialysis patients. The study was used descriptive research using cross-sectional design. This study had been implemented in Dr. Soetomo Hospital and conducted between March and April 2007. The samples had been selected by consecutive technique method. The blood serum for calcium, phosphorus and total alkaline phosphatase and albumin were analysed. The result found intact parathyroid hormone level (iPTH) decreased with age. The phosphorus level was observed lower in respondents with diabetes mellitus (DM) than non-DM but higher with longer haemodialysis duration. The corrected calcium met the optimal range of 8.4 mg/dl to 9.5 mg/dl and 38% of respondents had optimal of CaxP product less than 55mg2/dl2. There were 27.3% of respondents had optimal iPTH level with range of 150 pg/ml and 300 pg/ml. The intact parathyroid hormone level in diabetes mellitus (DM) tended lower than non-DM and increased by longer haemodialysis duration. Low turnover prediction (iPTH< 60pg/ml) was 11.3% and high turnover prediction (iPTH> 200 pg/ml with total alkali phosphatase >207 IU/L) was 22%.

Keywords: Calcium, Chronic Kidney Disease, Diabetes Mellitus, Haemodialysis, Phosphorus, Total Alkaline Phosphatase

Introduction
Chronic kidney disease (CKD) is public health problem which 5% to 10% of world population suffered CKD. In the United States, 16% of the adult population is suffering CKD. The main cause of CKD mortality such as cardiovascular diseases which mortality rate reaches 52%. The haemodialysis is provided an additional life expectancy for late-stage of CKD. Furthermore, there is still high rate of cardiovascular morbidity and mortality in late stage CKD patients undergone haemodialysis. In general, late-stage CKD patients with haemodialysis less than 65 years old had cardiovascular mortality of 10-500 times higher than healthy person. Besides, cardiovascular mortality in young adult patients aged between 24 years old and 37 years old undergone haemodialysis has similar cardiovascular mortality number in general population aged 70 years old to 80 years old1,2,3.

The cardiovascular risk factors such as diabetes mellitus, hypertension, smoking and dyslipidaemia but insufficient in explained increment of cardiovascular morbidity and mortality in CKD patients. There are metabolic and bone mineral disorders conditions such as calcium (Ca), phosphorus (P), hormonal such as parathyroid hormone (PTH) and calcitriol (1.25 (OH) 2D3) or called as secondary hyperparathyroidism. The mineral and bone disorder in CKD patients occurs during stage 3 of CKD and gained weight with decline in kidney functions. The mineral and bone disorder are estimated suffered by more than 300,000 in late stage of CKD patients undergone haemodialysis. The longer

Corresponding author:
Djoko Santoso
E-mail: djoko-santoso@fk.unair.ac.id
haemodialysis process and drug such as calcium-based phosphate binder and vitamin D lead increasing in complications of mineral and bone disorders complex. If therapeutic intervention is improper managed will contribute to the complications.

The mineral and bone disorder is associated with changes arterial elasticity in form of cardiovascular calcification and identified as major cause of cardiovascular morbidity and mortality in late stage of CKD patients. The etiology of CKD due to diabetes mellitus provide more specific or relative hypoparathyroid profile than non DM.

The study aims to determine chronic kidney disease-mineral and bone disorder laboratory profile in chronic haemodialysis patients in Dr. Soetomo Hospital, Surabaya. The data obtained can be used as reference for treatment and prevention of CKD-MBD syndrome in sustained haemodialysis patients.

Methodology

This study was used a descriptive research with cross sectional design. This study had been implemented in Dr. Soetomo Hospital, Surabaya. The study was conducted between March and April year 2007. The study population was all chronic kidney patients who undergone haemodialysis in Dr. Soetomo Hospital, Surabaya. The study samples were 150 respondents which met the study inclusion criteria. The samples were selected by consecutive technique method. The data was collected through primary data which presented and analysed descriptively.

Result and Discussion

The lowest age was 17 years and highest age was 78 years. The highest proportion was between 50 years and 59 years with 36.7% (55). 84% of respondents with age less than 60 years and 16% of respondents were aged more than 60 years as shown in Figure 1.

There were 48 respondents (32%) had suffered diabetes mellitus and 102 respondents (68%) were non-DM and consisted 73 respondents (48.7%) due to hypertension, 11 respondents (7.3%) caused by glomerulonephritis, 13 respondents (8.7%) caused by urine tract stones and 5 respondents (3.3%) caused by polycystic kidney disease (Figure 2).

Figure 1. Distribution of respondent based on age

Figure 2. Respondent distribution based on the etiology of chronic kidney disease

In Figure 3, 34 respondents had undergone haemodialysis less than 6 months, 70 respondents (46.7%) had undergone haemodialysis between 6 months and 18 months, 46 respondents (30.7%) undergone haemodialysis more than 18 months as shown in Figure 3.

Figure 3. Respondent profile period for haemodialysis

The phosphorus level distribution was categorized as 6 respondents (4%) had less than 3.5 mg/dl, 33 respondents (22%) had optimal level between 3.5 mg/dl and 5.5 mg/dl and 111 respondents (74%) had phosphorus level more than 5.5 mg/dl (Figure 4).
Meanwhile, older age group had phosphorus less than 3.5 mg/dl and more dominant in respondents less than 60 years old. In additions, there were 5.9% had haemodialysis less than 6 months with phosphorus less than 3.5 mg/dl and 67.1% of respondents had haemodialysis between 6 months and 18 months for phosphorus more than 5.5 mg/dl. The phosphorus levels tend to increase with longer haemodialysis duration.

In Figure 5, 83 respondents (55.3%) had optimal levels of calcium between 8.4 mg/dl and 9.5 mg/dl and 32 respondents (21.3%) had calcium levels more than 9.5 mg/dl.

In Table 1, mean age was 48.97 with standard deviation of 11.76. The minimum and maximum of age were 17 years and 78 years. There were male respondents (67.3%) and 49 female respondents (32.7%) involved in this study. In additions, 48 respondents (32%) had suffered diabetes mellitus and 102 respondents (68%) were non-DM. Furthermore, 82 respondents (54.7%) had haemodialysis once per 5 days and 36 respondents (24%) had haemodialysis of twice per a week. Meanwhile, phosphorus mean was 7.4 mg/dl with standard deviation of 2.6 mg/dl and calcium had mean of 8.7 mg/dl with standard deviation of 1.3 mg/dl. The iPTH had mean and standard deviation of 191.6 pg/ml and total alkaline phosphatase had mean and standard deviation of 308.80 IU/L and 270.7 IU.
**Discussion**

In this study, there were 22% of respondents had optimal phosphorus level between 3.5 mg/dl and 5.5 mg/dl. Besides, there were 4% of respondents with hypophosphatemia had phosphorus level of less than 3.5 mg/dl and 74% of respondents found hyperphosphatemia with phosphorus more than 5.5 mg/dl.

Besides, number of haemodialysis machines was limited the study result on haemodialysis which haemodialysis was affected in dispose of phosphorus. Every week, the phosphorus was detected positive or exceed the balance, so the restriction of protein diet and phosphorus binder was very reliable. However, this restriction lead malnutrition and dilemma among CKD patients with haemodialysis. The respondents had attended the diet counselling and its difficult since most respondents had low socio-economic. The inability to use phosphate binder was more effective and expensive.

In this study, tendency of phosphorus level decreased in older age group. The previous studies in Iran and Spain found significant negative correlation between phosphorus level with increment of age. Lorenzo et al. (2006) found older age had low calorie and protein intake. In additions, the respondents with DM appeared more dominant in phosphorus less than 3.5 mg/dl than non-DM group. Meanwhile, 81.4% of non-DM and 58.3% of DM had obtained phosphorus more than 5.5 mg/dl. The DM group tended more proportion of low phosphorus than non-DM group.

There were respondents had phosphorus level more than 5.5 mg/dl experienced long haemodialysis duration. Hyperphosphatemia was more dominated in CKD patient with long haemodialysis with tendency increment in phosphorus level. Furthermore, corrected of calcium level among the respondents who under the control target range of 8.4 mg/dl to 9.5 mg/dl was 83 respondents (55.3%). The calcium level decreased in 35 respondents (22.3%) below optimal level less than 8.4 mg/dl. The study also found 20 respondents had hypercalcemia more than 10 mg/dl. There were 137 respondents were used calcium based phosphate binder (CaCo3) and only available at health insurance providers and relatively affordable in Indonesia. Besides, no patients were using calcitriol in hospital.

The correct calcium more than 9.5 mg/dl found in respondents aged 30 years and 39 years old but there was no apparent trend of certain calcium level in age changes. The corrected calcium more than 9.5 mg/dl in haemodialysis with range of percentages of 17.6%, 14.35% and 34.8% with haemodialysis duration of less than 6 months, 6 months to 18 months and more than 18 months consecutively. In this study, there was tendency for elevated level of corrected calcium to decrease over the haemodialysis duration. Steven et al. found significant increment in corrected calcium level with haemodialysis more than 18 months. The phosphorus serum fluctuated more than calcium so the product of CaxP is strongly influenced by phosphorus level. The CaxP product was only practical clinical guide to the change of phosphorus and calcium.

In this study, recommendation of optimal control range of iPTH level between 150 pg/ml and 300 pg/ml of 27.3%. There was tendency for low of iPTH levels in developed countries due to high calcitriol usage with calcium based phosphate binders. In develop countries, non-calcium based phosphate binder was widely used, calcimimetic preparation as well as vitamin D analogues that have less effectiveness on hypercalcemia which helps prevent hypercalcaemia and secondary hyperparathyroidism. In this study, no any calcitriol or vitamin analogues did not used to suppress iPTH since these preparations are relatively expensive for most patients and did not belong to any health insurance provider.

The respondents with aged more than 30 years old and above had dominated proportion of iPTH less than 150 pg/ml level with highest proportion in respondents aged 66 years old group with percentage of 66.7%. Furthermore, iPTH less than 300 pg/ml is more dominated in less than 60 years old and iPTH levels more than 800 pg/ml was dominated in respondents of 30 years old and 39 years old. The tendency in increment of iPTH levels with increased age.

There were 56% of respondents had iPTH less than 150 pg/ml which more than respondents with iPTH above 300 pg/ml of 16.7%. The trend of increment of iPTH levels was observed with high in albumin level. There was indirect relationship between iPTH level and albumin level which low albumin levels correlated with low ionized calcium level. Low albumin levels was caused malnutrition and wasting syndrome.
In addition, 11.3% of respondents had iPTH less than 60 pg/ml with low turnover prediction while 47 respondents (31.3%) had iPTH more than 200 pg/ml with high turnover prediction. Meanwhile, 33 respondents had total alkaline phosphatase more than 207 IU/L that involved with high turnover bone diseases. The increment in total alkaline phosphatase in high iPTH level group will strengthen prediction of high turnover type.

This study obtained diversity of abnormality CKD-MBD laboratory profiles experienced by other studies that influenced by differences in CKD, percentage of etiology CKD, differences in haemodialysis duration, difference dialysis profiles and accompanying therapy, weekly haemodialysis duration and sufficiency of dialysis dose achievement. Besides, other consideration were differences in tolls, laboratory methods as well as research forms that were part of cross-sectional. In additions, the biological and clinical effects causes also considered in laboratory result. The mineral metabolism management also required the complex role of dialysis therapy, phosphorus binding usage, calcimimetics and vitamin D analogues, dietary interventions, patients and family education, communication and compliance. There was difficulty for hospital to achieve good in the CKD-MBD syndrome management.

**Conclusion**

In conclusions, respondent age mean was 48.97 years with age distribution less than 60 years with more male respondents in this study. The phosphorus level was reduced in older age group and tended to be lower in respondents with diabetes mellitus than non-diabetes mellitus. Besides, the phosphorus level also observed to increase in respondents with longer haemodialysis duration. The correlated calcium level and iPTH were lower in the respondents with DM than non-DM. Furthermore, iPTH and albumin levels increased in the respondents with longer haemodialysis duration.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

11. V. Lorenzo et al., “Prevalence, clinical correlates


The Relationship between Estimated Glomerular Filtration Rate (eGFR) with Hepcidin in CKD Patients That Have Not Undergone Dialysis

Decsa Medika Hertanto¹, Ami Ashariati¹, Nunuk Mardiana¹, Djoko Santoso¹
¹Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

Functional iron deficiency anemia is anemia that often occurs in CKD but is frequently not well diagnosed. Measurement of hepcidin may show an earlier functional iron deficiency status. The relationship between hepcidin and eGFR has not been widely studied. This study is to determine the association between eGFR and hepcidin in patients with CKD who have not undergone dialysis. 37 patient with CKD stage 3 to 5, age 20 - 80 years old, both male and female gender, who control at Outpatient Clinic of Dr.Soetomo Hospital were the subjects of study. Levels of hepcidin and eGFR were measured in patients with CKD. Sampling is done by consecutive sampling. The data obtained is then analysed using spearman parametric test. The results showed that among 37 subjects, 67.6% were male with average age 56.84 ± 12.27 years. Among them the common cause was hypertension (75%). Stage 3 (43.2%) is the common stage in this study. The mean hemoglobin level in this study was 10.88 ± 2.21 g / dl, with BUN 33.94 ± 21.1 mg / dl, and serum creatinine 3.42 ± 2.25 mg / dl. Average eGFR was 26.72 ± 16.12 ml/min/1.73m2. The median hepcidin level was 48.58 ng/ml (0.12 - 439.07 ng/ml). eGFR levels correlated negatively with hepcidin level (r = -0.633; p-value 0.000). In conclusion, lower eGFR level is negatively associated with hepcidin level which indicated that when eGFR decreasing, the hepcidin level will be increasing.

Keywords: eGFR, Hepcidin, Anemia, Chronic Kidney Disease

Introduction

Chronic kidney disease (CKD) is a chronic inflammatory disease with a low grade. The inflammatory causes of CKD are decreased cytokine secretion, increased oxidative stress, and recurrent infections. Inflammation secreted several cytokines, IL-6, which stimulates the liver to produce the hepcidin hormone¹,². The hepcidin hormone functions as a regulator of iron hemostasis, which inhibits iron secretion in macrophages. As a result of this condition causes an increase in the hepcidin hormone and a decrease in peripheral iron, but iron in the tissues and macrophages is actually high. This condition is known as functional iron deficiency⁵. In CKD, there is a lot of functional iron deficiency but so far it has not been noticed, as a result of CKD anemia⁴,⁶. Anemia at an advanced stage often causes resistance to erythropoietin which is thought to be due to high hepcidin levels⁷,⁸. Gupta et al.⁹ reported a decrease in kidney function followed by an increase in proinflammatory cytokines. Other researchers Mercadel et al.¹⁰ stated that patients with stage 1-5 non hemodialysis CKD had an increase in hepcidin and a not-so-high increase in CRP indicating low grade of inflammation. Atkinson et al.¹¹ in stage 1-5 CKD patients, functional iron deficiency anemia was found to correlate with hepcidin. In the study by Wagner et al.¹², it was reported that in CKD stage 3-5, hepcidin levels increased accordingly to a decrease in hemoglobin level. The decrease in eGFR in CKD will be followed by an increase in inflammation characterized by an increase in cytokines such as IFN, TNFa, IL-1, IL-6, and IL-10. This surge in cytokines is caused by a disruption of the elimination of these cytokines in the kidneys, in addition to repeated infections, increased oxidative stress, uremic conditions, metabolic acidosis also affects the increase in inflammatory conditions⁸,¹³. These cytokines will
later increase hepcidin production in the liver which is suspected as the cause of anemia deficiency in CKD\textsuperscript{5,8,14}.

To determine the relationship of decreased kidney functions to hepcidin synthesis, hepcidin research was carried out in CKD stage 3-5. In order to prove the presence of inflammation, inflammatory parameters were assessed, namely IL-6, LED and CRP in a cross-sectional manner with a population of kidney poly patients at Dr.Soetomo Hospital.

**Methodology**

The study design was an observational analytic study which aimed to determine the relationship between eGFR and hepcidin in CKD patients who had not yet undergone dialysis. The study was carried out in the Outpatient Hospital Dr.Soetomo Surabaya, by taking blood samples from August 1, 2017 to March 1, 2018. The study sample was part of the affordable population included, which was in accordance with the inclusion criteria.

Inclusion criteria: All patients who were the study sample were male or female, ages 20 - 80 years, and willing to take part in research and sign an informed consent.

Exclusion criteria: Exclusion was carried out in patients infected with hepatitis B, hepatitis C, liver cirrhosis, diabetes mellitus, obesity, and patients who were receiving erythropoietin / steroid / iron therapy / blood transfusion / or hormonal therapy (in 3 months).

Sampling was carried out by consecutive sampling, to obtain a predetermined number of samples, 37 samples.

**Results**

**Clinical Characteristics**

The results of the measurement of clinical data of 37 CKD patients obtained information revealed that most CKD patients had a hemoglobin level of 10.88 with a standard deviation of 2.21 as shown in Table 1. The distribution at each stage found that the average hemoglobin in stage 3 was 12.11 with a standard deviation of 1.79, the mean in stage 4 was 11.28 with a standard deviation of 2.32, and the mean at stage 5 was 8.95 with a standard deviation 1.14. BUN level measurements in this study obtained an overall average of 33.94 with a standard deviation of 21.1. The characteristics of BUN levels at each stage, namely in stage 3, obtained a mean BUN level of 21.06 with a standard deviation of 7.15, mean BUN in stage 4 of 27.2 with a standard deviation of 7.74, and in stage 5 an average of 56.16 with a standard deviation of 22.96. The measurement of creatinine serum levels in this study obtained a total mean of 3.42 with a standard deviation of 2.25. Creatinine serum levels at each stage were stage 3 at 1.71 with a standard deviation of 0.24, mean at stage 4 at 2.78 with a standard deviation of 0.87, and a mean at stage 5 of 6.19 with a standard deviation 1.74.

**Table 1. Clinical characteristics**

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 3</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>12.11 ± 1.79</td>
</tr>
<tr>
<td>Range</td>
<td>8.6 - 14.6</td>
</tr>
<tr>
<td>BUN</td>
<td>21.06 ± 7.15</td>
</tr>
<tr>
<td>Range</td>
<td>11 - 38</td>
</tr>
<tr>
<td>Creatinine serum</td>
<td>1.71 ± 0.24</td>
</tr>
<tr>
<td>Causes of CKD</td>
<td>11 (36.6 %)</td>
</tr>
<tr>
<td>Hypertension (n)</td>
<td>5 (50%)</td>
</tr>
</tbody>
</table>
eGFR Value in Each CKD Stage

Table 2 shows the distribution of eGFR values according to the CKD-EPI formula for 37 patients of the study sample based on the stage of CKD. Distribution of examination of eGFR values among 37 CKD patients based on the recorded stage degree from the results of the stage 3 eGFR examinations was 42.81 with a standard deviation of 7.61, mean of stage 4 eGFR of 22.11 with a standard deviation of 4.45, and mean eGFR in stage 5 at 8.75 with a standard deviation of 3.27. The average characteristics of eGFR values in the overall results of this study amounted to 26.72 with a standard deviation of 16.12.

### Table 2. Characteristic value of eGFR in each CKD stage

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 3</td>
</tr>
<tr>
<td></td>
<td>Mean ± Standard deviation</td>
</tr>
<tr>
<td></td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td>33 - 60</td>
</tr>
</tbody>
</table>

Hepcidin Levels in Each CKD Stage

The distribution of hepcidin serum values in 37 patients of the study sample based on the stage of CKD is shown in Table 3. Distribution of examination of hepcidin levels in 37 CKD patients based on the recorded stage degrees from the results of median hepcidin examination at stage 3 was 23.17 ng / ml with a range of 0.12 - 70.14, median hepcidin at stage 4 was 83.02 ng / ml with ranges from 1.08 - 254.87, and median hepcidin at stage 5 is 118.86 ng / ml with a range of 9.96 - 439.07. The control value of hepcidin levels in this study was 20.65 - 42.89 ng / ml. The median characteristics of hepcidin values in the overall results of this study amounted to 48.58 ng / ml with a range of 0.12 - 439.07.

### Table 3. Characteristic value of hepcidin in each CKD stage

<table>
<thead>
<tr>
<th>Value</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Stage 3</td>
</tr>
<tr>
<td>Hepcidin Median</td>
<td>23.17</td>
</tr>
<tr>
<td>Range</td>
<td>0.12 – 70.14</td>
</tr>
</tbody>
</table>

Relationship between eGFR value and Hepcidin level

The test results of the analysis of the relationship between eGFR values and hepcidin levels showed that there was a relationship with a correlation coefficient with a negative value of -0.633. The relationship in this study is also significant, indicated by the value p = 0,000. The meaning of this negative correlation coefficient shows an inverse relationship, if the eGFR value decreases, the hepcidin level will increase.

Discussion

Average eGFR value in each CKD Stage

The results of the CKD-EPI eGFR values were averaged at each stage, namely in stage 3 of 42.81 ml / min / 1.73 m² with a standard deviation of 7.61, stage 4 of 22.11 ml / min / 1.73 m² with standard deviation of 4.45, and stage 5 of 8.75 ml / min / 1.73 m² with a standard deviation of 3.27. The average total eGFR in this study was 26.72 ml / min / 1.73 m² with a standard deviation of 16.12. In the study conducted by Mercadel
et al.\textsuperscript{10}, the obtained mGFR values in stage 3a (45-60) at 18.1 ml / min / 1.73 m\textsuperscript{2}, stage 3b (30-45) at 33.7 ml / min / 1.73 m\textsuperscript{2}, stage 4 as high as 28.1 ml / min / 1.73 m\textsuperscript{2}, and in stage 5 it is 7 ml / min / 1.73 m\textsuperscript{2}. The total mean mGFR value at all stages was 35.3 ml / min / 1.73 m\textsuperscript{2}, whereas if the GFR was measured the estimation using the CKD-EPI method was 34.2 ml / min / 1.73 m\textsuperscript{2}. The results of the Mercadel et al.\textsuperscript{10} with this study only differed slightly.

**Hepcidin Level in Each CKD Stage**

The results of this study found that the median of total hepcidin level was 48.58 ng / ml with a range of 0.12 - 439.07 (Control value of hepcidin levels 20.65 - 42.89). The median division of hepcidin levels that are in accordance with CKD stages is in stage 3 of 23.17 ng / ml (range 0.12 - 70.14), stage 4 is 83.02 ng / ml (range 1.08 - 254.87) , and at stage 5 of 118.86 ng / ml (range 9.96 - 439.07). The results of this study do not differ greatly from the research conducted by Zaritsky et al.\textsuperscript{18}; Mercadel et al.\textsuperscript{10}; and Manolov\textsuperscript{20} that is an increase in hepcidin levels occurred as the stages progress. Zaritsky et al.\textsuperscript{18} divided the study sample into controls, stage 2 to 4 CKD, and stage 5 CKD. In this study the median control group was 72.9 ng / ml, in the 2-4 stage CKD group it was 127.3, and the Dialysis CKD stage 5 group is 652.4 ng / ml. On the other hand, in a study conducted by Mercadel et al.\textsuperscript{10} did not explain hepcidin levels at each stage but, the researchers included an increase in hepcidin levels from 23.3 ng / ml to 36.1 ng / ml if there was a decrease in mGFR values from > 60 ml / min / 1.73 m\textsuperscript{2} to <15 ml / min / 1.73 m\textsuperscript{2}. In the study done by Manolov\textsuperscript{20}, the levels of hepcidin in the 3 groups were in the stage 2-4 CKD group with a score of 90.74 ng / ml, in the CKD 5 group which had chronic dialysis of 282.49 ng / ml and in the control group 12.7 ng / ml. This is not much different from the results of this study.

**Relationship between eGFR and Heparidin in CKD Patients**

The test results of the analysis of the relationship between eGFR and hepcidin levels in CKD patients showed a significant relationship (correlation coefficient value of -0.633; p-value of 0.000) indicating that a decrease in eGFR was found to be inversely proportional to increasing hepcidin levels. The results of this study are consistent with the results of a study conducted by Zaritsky et al.\textsuperscript{18} and Uehata et al.\textsuperscript{19} who concluded that there was a negative relationship between eGFR and hepcidin levels. Zaritsky et al.\textsuperscript{18} conducted a study of the importance of the role of hepcidin as a novel biomarker for iron status in CKD patients and their relationship with eGFR. In this study using stage 2-5 CKD samples found a negative relationship between eGFR and hepcidin with R of -0.61 (p = 0.001). The method used in the measurement of hepcidin is ELISA 23. Uehata et al.\textsuperscript{19} did an observational cross-sectional study of the relationship between hepcidin and anemia related to CKD. In this study also the relationship of hepcidin with eGFR was observed which showed a negative correlation between eGFR and hepcidin with r = -0.27 (p <0.001). The sample used did not exclude erythropoietin> 2 weeks and diabetes mellitus. The method of measuring hepcidin levels using liquid chromatography tandem mass spectrometry (LC-MS / MS) 25. In the study carried out by Troutt et al.\textsuperscript{17} examined hepcidin-25 which increases with increasing kidney stage and negatively correlates with eGFR. There was also a negative correlation between hepcidin and eGFR using the Cockcroft-Gault formula with R = -0.32 (p = 0.001). The difference in the results of this study can also be caused by the use of different methods of measuring hepcidin namely ELISA and Mass spectrometry-based methods\textsuperscript{7}.

**Conclusions**

The profile of general characteristics in this study found that the highest sex average was male (67.6%) with an average age of 56.84 years. Most of the CKD stages in this study were stage 3 (43.2%) with most common cause of was hypertension (75%). The mean hemoglobin level in the subjects of this study was 10.88 g / dl, with a mean BUN of 33.94 mg / dl, and a mean creatinine serum of 3.42 mg / dl. The mean and standard deviation of eGFR values in the subject of this study amounted to 26.72 ± 16.12 ml / min / 1.73 m\textsuperscript{2}. The obtained mGFR values in stage 3a (45-60) at 18.1 ml / min / 1.73 m\textsuperscript{2}, stage 3b (30-45) at 33.7 ml / min / 1.73 m\textsuperscript{2}, stage 4 as high as 28.1 ml / min / 1.73 m\textsuperscript{2}, and in stage 5 it is 7 ml / min / 1.73 m\textsuperscript{2}. The total mean mGFR value at all stages was 35.3 ml / min / 1.73 m\textsuperscript{2}, whereas if the GFR was measured the estimation using the CKD-EPI method was 34.2 ml / min / 1.73 m\textsuperscript{2}. Median deviation of eGFR values in the subject of this study amounted to 26.72 ± 16.12 ml / min / 1.73 m\textsuperscript{2}. The mean and standard deviation of eGFR values in the subject of this study amounted to 26.72 ± 16.12 ml / min / 1.73 m\textsuperscript{2}. Median hepcidin levels in the subject of this study amounted to 48.58 ng / ml with a range of 0.12 - 439.07 ng / ml. In this study, there was a significant negative relationship with moderate strength between eGFR and hepcidin levels (r = - 0.633; p-value 0.000) which showed that if there was a decrease in eGFR values, there would be an increase in hepcidin levels. Increased levels of hepcidin which is most likely affected by inflammation since the beginning of the CKD stage need to be watched out for because it has the potential to result in functional iron deficiency anemia.
Ethical Clearance: Taken from the committee
Source of Funding: Nil
Conflict of Interest: Nil

References
8. Handbook of Disease Burdens and Quality of Life Measures. 2010;4144.
Association of Glomerular Filtration Rate with Intact Parathyroid Hormone in Non-dialysis Chronic Kidney Disease Patients

Djoko Santoso¹, Ach Syaiful Ludfi¹, Nunuk Mardiana¹, Widodo¹
¹Faculty of Medicine, Airlangga University, Surabaya, 60115 Indonesia

Abstract

Hyperparathyroidism is one of mineral and bone metabolism disorders in chronic kidney disease currently known as chronic kidney disease-mineral and bone disorders. The study aims to analyse the association between glomerular filtration rate and intact parathyroid hormone levels in non-dialysis chronic kidney disease patients at Internal Medicine Outpatient Clinic in Dr. Soetomo Hospital. The study was used observational analytic study with cross sectional design. The samples were 62 non-dialysis chronic kidney disease patients who met the inclusion and exclusion criteria. In this study, the variables were glomerular filtration rate calculated by the CKD-EPI formula and intact parathyroid hormone measured by Electro-chemiluminescence immunoassay (ECLIA) method. The data was analysed using Pearson or Spearman non-parametric tests. The Pearson or Spearman non-parametric tests obtained r=-0.518 and p=0.000.

Keywords: Calcium, Chronic Kidney Disease, Diabetes Mellitus, Hypertension, Phosphorus

Introduction

Chronic kidney disease (CKD) are risk for bone, vascular, and death abnormalities due to calcium, phosphorus and parathyroid hormone disorders¹. The management in patients with impairment of minerals metabolism especially parathyroid hormone which more focus on severe CKD patients. The unbalance of calcium and phosphate leads to secondary hyperparathyroid affects the vascular calcification and bone abnormalities. Minor metabolism and bone disorder will occur in person with reduction in kidney function at early stage. The symptoms are asymptomatic and often unnoticed².

Secondary hyperparathyroidism is mineral and bone metabolism disorder in CKD and known as mineral and bone disorder in chronic kidney disease. The mineral and bone disorder in CKD is characterized by several factors such as metabolism disorders, calcium, phosphorus, vitamin D and parathyroid hormone³,⁴. In CKD with decrement of hyperphosphatemia occurs due to reduction of phosphorus excretion in kidney and increases of fibroblast growth factor-23 level (FGF23). The glomerular filtration rate decreases also lead reduce in 1.25 (OH) 2D3 which important for calcium absorption in the gut.

The hyperphosphatemia, FGF23, 1.25 (OH) 2D3 and calcium level has influence secondary hyperparathyroidism. The secondary hyperparathyroidism increases vascular calcification due to calcium-phosphorus deposition. In additions, secondary hyperparathyroidism causes renal osteodystrophy, immune dysfunction and anaemia⁵. Slinin et al.⁶ stated increment in cardiovascular diseases risk and mortality with hyperthyroid levels> 480 pg/mL.

Approximately, 2 million to 4.7 million people suffers CKD with secondary hyperparathyroidism need treatment costs of $ 52 billion to $122 billion per year in the United States⁷. Secondary hyperparathyroidism is often overlooked, undiagnosed and insufficient treated by clinicians due to lack of studies in non-dialysis CKD patients⁸. Owda et al.⁹ had found 78% of CKD patients undergone dialysis also experiences with secondary hyperparathyroidism. Meanwhile, Young et al.¹⁰ found 50% of dialysis patients had secondary
hyperparathyroidism\textsuperscript{10}. In additions, there was an increment of 24\% of stage 3 and 4 CKD patients in secondary hyperparathyroidism\textsuperscript{11}. Levin et al.\textsuperscript{12} also found pre-dialysis patients had hyperparathyroidism in glomerular filtration rate < 60ml/minute/ 1.73 m\textsuperscript{2}.

Several studies stated decreasing in glomerular filtration rate will increase risk of secondary hyperparathyroidism. Hence, early parathyroid hormone detection test is helpful in CKD patients since secondary hyperparathyroidism caused blood vessel calcification and risk of cardiovascular diseases\textsuperscript{13, 14}. The study aims to analyze the association between glomerular filtration rate and intact parathyroid hormone levels in non- dialysis chronic kidney disease patient at Internal Medicine Outpatient Clinic in Dr. Soetomo Hospital.

Methodology

The study was used observational analytical research with cross-sectional design. The study was conducted at Internal Medicine Outpatient Clinic in Dr. Soetomo Hospital. The study population was chronic kidney disease patients in Internal Medicine Outpatient Clinic in Dr. Soetomo Hospital. The samples were 29 respondents which met the inclusion criteria. The samples were selected by consecutive sampling method. The data was analysed by using SPSS program and tested by Kolmogorov Smirnov test.

Result and Discussion

In Table 1, most respondents were male (85.5\%) and only 9 respondents (14.5\%) were female with mean age of 52.05 years old. Meanwhile, body mass index (BMI) mean included mean upper arm circumference within normal limits. The mean of creatinine serum was 5.8 with standard deviation of 4.28. The hypertension was most comorbid disease included mean of calcium or phosphorus levels within normal limits. The comorbid diseases found in CKD patients were diabetes mellitus (DM) with 41 respondents (66.1\%), hypertension with 48 respondents (77.4\%) and combination of DM and hypertension with 32 respondents (51.6\%).

Based on Table 2, median of glomerular filtration rate were 14 ml/minutes. Meanwhile, smallest glomerular filtration rate was 2 ml/minutes and highest of glomerular filtration rate was 59 ml/minutes.

<table>
<thead>
<tr>
<th>Glomerular filtration rate value</th>
<th>Result (ml/minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>2 - 59</td>
</tr>
<tr>
<td>Median</td>
<td>14.0</td>
</tr>
</tbody>
</table>

Median of intact parathyroid hormone was 97.89 pg/ ml with lowest value of 15.46 pg/ml and highest value of 477.3 pg/ml. The intact parathyroid levels in non-dialysis CKD patients as shown in Table 3.
Table 3. Intact Parathyroid hormone level on non-dialysis CKD patients

<table>
<thead>
<tr>
<th>Intact parathyroid hormone level</th>
<th>Result (pg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>15.46-477.3</td>
</tr>
<tr>
<td>Median</td>
<td>97.89</td>
</tr>
</tbody>
</table>

The comparison of intact parathyroid hormone levels intake in glomerular filtration rate by using Kruskal Wallis test due to abnormal data distribution. Kruskal Wallis test was obtained $p=0.000$ that concluded there was significant differences of intact parathyroid hormone in each of glomerular filtration rate group. The median of intact parathyroid in glomerular filtration rate of 30 ml/minutes to 59 ml/minutes equal to 57.26 pg /ml and glomerular filtration rate of 15 ml/minutes to 29 ml/ minutes was equal 92.08 pg /ml.

Table 4. Comparison of intact parathyroid hormone level intact based on glomerular filtration rate group

<table>
<thead>
<tr>
<th>Parameter</th>
<th>GFR 30-59 ml/minute (n=20)</th>
<th>GFR 15-29 ml/minute (n=11)</th>
<th>GFR&lt;15 ml/minute (n=31)</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intact parathyroid hormone level (pg/ml)</td>
<td>57.26 (29.7-174.2)</td>
<td>92.08 (15.4-119.8)</td>
<td>162.6 (23.5-477.3)</td>
<td>0.000</td>
</tr>
<tr>
<td>Median (min-max)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An association hypothesis test between glomerular filtration rate and intact parathyroid hormone was performed. In the normality test data with Kolmogorov- Smirnov can be concluded data has spread normally if $p$ value obtained is greater than significance level of 5%. The normality test of glomerular filtration rate and intact parathyroid hormone was obtained $p$ value of 0.000 and 0.000 which concluded that glomerular filtration rate and intact parathyroid hormone distribution was abnormal as shown in Table 5.

Table 5. Normality test

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>$p$-value Kolmogorov-Smirnov</th>
<th>Explanation</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GFR</td>
<td>0.000</td>
<td>Abnormal</td>
<td></td>
</tr>
<tr>
<td>PTH level</td>
<td>0.000</td>
<td>Abnormal</td>
<td></td>
</tr>
</tbody>
</table>

In Table 6, the result showed Spearman $r$ value was -0.518 with $p$-value of 0.000.

Table 6. Result of spearman rank of glomerular filtration with intact parathyroid hormone

<table>
<thead>
<tr>
<th>Variable 1</th>
<th>Variable 2</th>
<th>$R$ Spearman</th>
<th>$p$-value</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glomerular filtration rate</td>
<td>Intact parathyroid hormone</td>
<td>-0.518</td>
<td>0.000</td>
<td>Meaningful</td>
</tr>
</tbody>
</table>

Discussion

The result found mean of respondent age were 52 years which highest group proportion was between 41 years and 60 years. In additions, most male respondent with male to female of 5.9:1. The influence in gender toward CKD is still unknown even the ratio of CKD patients between male and female was different. Previous study suggested female had lower progression of CKD than male$^{15}$. Jafar et al.$^{16}$ mentioned that progression of CKD in post-menopausal female was higher than male.

In this study, glomerular filtration rate was calculated using CKD-EPI formula with median of 14 ml/minutes that lower than previous studies. In De Boer study$^{11}$ found mean of glomerular filtration rate of 34 ml/minutes per
1.73 m² with used MDRD formula. Meanwhile, Sinha et al. obtained mean of glomerular filtration rate of 37.2 ml/minutes per 1.73 m³. Besides, low median of glomerular filtration rate was obtained due to abnormal patient distribution which 50% of respondents with glomerular filtration rate less than 15 ml/minutes.

The mean body mass index (BMI) was 23.43 kg/m² within normal category. De Boer et al. found mean of BMI was 26.9 kg/m² or in overweight (pre-obesity). Albumin mean was 3.89 g/dl which not much different from De Boer et al. with albumin mean was 3.7 g/dl. Besides, upper arm circumference was normal with 27.09 cm. Creatinine serum mean was 5.89 mg/dl similar to Malawadi et al. study showed 5.5 mg/dl. The creatinine serum mean was high due to uneven distribution of patients which most patients had low glomerular filtration rate less than 15 ml/minutes.

Furthermore, comorbid diseases in CKD only focused on diabetes mellitus and hypertension obtained by anamnesis patients. The hypertension was 77.4% and diabetes mellitus of 66.1% obtained in this study. Joly et al. (2011) found 86% of respondents suffered hypertension and 45% of respondents suffered diabetes mellitus in Asia population.

In this study, mean of normal phosphorus level was 4.79 mg/dl which slightly higher than other studies by De Boer et al. and Fajtova et al. were 4.2 mg/dl and 4.16 mg/dl. The difference in mean of phosphorus level which relatively higher than other studies due to differences in the patients distributions.

Meanwhile, calcium concentration was 8.49 mg/dl within normal range due to most patients had calcium levels below optimal value (43.5%). This condition may occur caused by decrement 1.25-dihydroxyvitamin D3 in CKD patient at glomerular filtration rate ≤60 mL/minute / 1.73 m².

In this study, glomerular filtration rate was calculated using CKD-EPI formula with median glomerular filtration rate 14 ml/minutes. There were 50% of respondents with glomerular filtration rate less than 15 ml/minutes. The glomerular filtration rate was small which related to the health insurance system policy in Indonesia which most CKD patients with stage 5 in Dr. Soetomo Hospital.

Besides, insufficient intact hyperthyroid hormone levels were probably due high number of patients suffered DM (66%). The patients with DM had lower of intact parathyroid hormones than patients without DM. Insufficient of intact parathyroid hormone also influenced with normal of calcium and phosphorus levels of 51.6% and 53.2%.

Furthermore, it also appears that the median HPT intact value will increase with the decrease in kidney function. Median HPT intact at LFG <15 ml/min higher than LFG> 15 ml/min. These results are similar to those of Levin, et al. where the median HPT intake value will increase as LFG decreases. The intact parathyroid hormone serum increased to be initial of CKD-MBD. The intact parathyroid hormone level in CKD was important as predictor of cardiovascular morbidity and mortality, endothelial dysfunction or systemic inflammation.

The correlation between glomerular filtration rate and intact parathyroid hormone in non-dialysis of CKD patients with p value= 0.000<0.05 in Dr. Soetomo Hospital, Surabaya. The spearman correlation coefficient value of -0.518 meant correlation between glomerular filtration rate with intact parathyroid hormone among non-dialysis CKD patients was medium. The negative or opposite direction of correlation meant decreased in glomerular filtration rate and increased in the intact parathyroid hormone.

**Conclusion**

In conclusions, there was significant correlation between glomerular filtration rate and intact parathyroid hormone. In additions, there was tendency that reduction in glomerular filtration rate and followed by increment of intact parathyroid hormone which calcium and calcium levels were still normal limits that could be consideration in management of mineral and bone disorder with CKD.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Water Soluble Protein Optimized Extraction from Microalgae Spirulina Platensis

Cynthia Dwi Anggraeni¹, Sudarno¹, Mochammad Amin Alamsjah¹
¹Faculty of Fisheries and Marine Universitas Airlangga, Surabaya 60115, Indonesia

Abstract

This research aimed to determine the factors influencing extraction of water soluble protein from Spirulina platensis which included the ratio of Spirulina platensis and aquadest, incubation time, and interaction of those two factors. This research contained two factors (ratio and incubation time) using factorial complete randomized experimental design with nine treatments and three replications. Ratios of Spirulina platensis and aquadest used were 1:40, 1:50, and 1:60, while the incubation times were 1, 2 and 3 hours. Parameter observed in this study was water soluble protein content of Spirulina platensis. Ratio of Spirulina platensis and aquadest significantly affected water soluble protein content (p<0.05). The highest content of water soluble protein was observed at the ratio of 1:50 (85.4742 μg/ml), while the highest water soluble protein content based on the incubation time was observed at 3 hours treatment (p<0.05). These results indicated that ratio and the incubation time influenced water soluble protein content on the extraction process of Spirulina platensis with the optimized extraction should be at the ratio of 1:50 for 3 hours.

Keywords: extraction, optimization, Spirulina platensis, water soluble protein.

Introduction

Spirulina platensis is one of the microalgae that has the potential as a food source. Complete nutrient content of Spirulina platensis and the presence of antioxidant compounds of ficocyanin pigments have been used as a dietary supplement¹. The utilization of Spirulina is to have the value of high protein content mainly on dried Spirulina protein and blue pigment (ficocyanin), reaching 20% of dry weight². The high protein content on Spirulina platensis, reaching 60 – 71%, could be used as a protein source³. Protein in Spirulina was composed of several amino acids, such as methionin, lysin, and systein, compared with the protein content in egg and milk⁴. Spirulina, which is a single cell organism, has other benefits as the source of carotenoids, chlorophyll, and other micronutrients⁵.

Protein source in Spirulina was one of nutrient types that could potentially provide important functional properties, such as maintaining the food product characteristics for an emulsifier, thickener, natural dyes, gel-forming, and others⁶. Spirulina is produced in the form of drugs, supplements, juices, tablet, as well as functional food. Spirulina also served as a food source of food for better immune system and Super Oxyde Dismutase (SOD) content⁷.

The utilization of Spirulina in the industry is not yet optimum. Optimization needs to be done to optimize the utilization of Spirulina. The existence of high-protein potential content in Spirulina could be developed quickly, as it had the ability to proliferate fast, season independence, not requiring an extensive land for culture⁸. The optimization process is done to make an important protein extracts by determining the maximum variables and interaction on the various parameters that influenced the extraction outcome. Based on the research background, further research needed to be conducted for obtaining the optimum process conditions of extracting water soluble protein in Spirulina platensis which will be done in this study. Protein produced is expected to be widely exploited, one of which was the application of water-soluble protein in fruit juice.

Corresponding author:
Mochammad Amin Alamsjah
E-mail: alamsjah@fpk.unair.ac.id

DOI Number: 10.5958/0976-5506.2019.00869.6
**Methodology**

This research used factorial complete randomized design (FCRD) experimental method with two factors, such as the ratio of *Spirulina* powder with aquadest and incubation time. These factors were divided into 9 treatments and 3 replications. The ratio treatments are 1:40, 1:50 and 1:60, while incubation time treatments are 1, 2 and 3 hours. These treatments were based on Safi et al.\(^8\), who used 0.5 g of *Spirulina platensis* to dissolve in 25 ml aquadest and incubated for 2 hours.

Sample preparations:

Water Soluble Protein Extract Production from *Spirulina platensis*

Protein extract production was done by measuring *Spirulina platensis* powder into the Erlenmeyer tube filled with aquadest and incubated based on the treatments given. Solutions made were homogenized using vortex and centrifuged at 6,000 rpm for 15 minutes.

Protein Content Measurement using Lowry Method

This measurement analysis was begun with preparing 2000 ppm of BSA (*Bovine Serum Albumin*) as the main standard solution. This solution was made from 0.5 g solid BSA added with 250 ml aquadest. This solution was diluted using 40, 80, 120, 160, and 200 ppm concentration series. This solution was then added with 5 ml of modified reagent for 10 minutes and 0.5 ml of Follin-Ciocalteu reagent, while being shaken for 30 minutes. Solution was measured using 760 nm spectrophotometer\(^9\).

Water Soluble Protein Content Analysis from *Spirulina platensis*

20 μl supernatant of *Spirulina platensis* was added with 1000 μl aquadest. This solution was added with 5 ml of modified reagent for 10 minutes and added with 0.5 ml of Follin-Ciocalteu reagent, while being shaken for 30 minutes. Solution was measured using 760 nm spectrophotometer\(^9\).

Blueberry Juice Production

Fruit juice production was done using 5 concentration treatments of water soluble protein based on Yusmarini et al.\(^10\), containing 0%, 25%, 50%, 75%, and 100% modification. Juice was produced using blender by mixing all ingredients needed, such as blueberry, lemon, water, sugar, and honey. Blueberry juice was added with the water soluble protein from the optimized extraction of *Spirulina platensis*.

Hedonic test is done using 30 non-expert panellists from Faculty of Fisheries and Marine, Universitas Airlangga, students. Indicators tested were appearance, colour, taste, aroma, and texture. Water soluble protein content result data was analysed using FCRD Analysis of Variance (ANOVA) statistical analysis with SPSS 16.0 software. Data containing significant difference was analysed continuously using Duncan’s Multiple Range Test (DMRT). Hedonic test and juice protein content were analysed using descriptive method.

**Results**

Concentration Measurement Results of BSA (Bovine Serum Albumin)

Measurement of protein levels is carried out using the Lowry method. The method uses a solution of BSA as a comparison solution by measuring uptake on UV-VIS spectrophotometers at a maximum wavelength of 760 nm. The BSA concentration series used are 40, 80, 120, 160, 200 ppm and the results are tabulates in Table 1. Making standard solutions with various series aims to determine protein levels in a sample using straight line linear regression obtained from a standard solution graph\(^9\). Absorption values of UV-VIS Spectrophotometry from BSA obtained absorbance figures which became the y-axis and BSA concentration as x-axis in the form of a curve. The BSA curve and calibration equation can be seen in Figure 1. The measurement results of BSA solution absorption produced a curve with a positive slope approaching 1 (0.9945) with a linear regression equation \( y = 0.0934x - 0.004 \). The absorbance results of *Spirulina platensis* extract using UV-VIS Spectrophotometry were included in the equations and calibration curves of the BSA.

**Table 1. UV-Vis spectrophotometer absorbance value of BSA series concentration**

<table>
<thead>
<tr>
<th>BSA Concentration (μg/ml)</th>
<th>Absorbance ((\lambda = 760) nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>0.091</td>
</tr>
<tr>
<td>80</td>
<td>0.169</td>
</tr>
<tr>
<td>120</td>
<td>0.291</td>
</tr>
<tr>
<td>160</td>
<td>0.373</td>
</tr>
<tr>
<td>200</td>
<td>0.456</td>
</tr>
</tbody>
</table>
Water Soluble Protein Content Analysis based on Ratio of *Spirulina platensis*: Aquades

Based on Table 2, the different ratio of *Spirulina platensis* and aquades affected the water soluble protein content is exposed. The highest water soluble protein was obtained from 1:50 ratio, while the lowest was observed at 1:40 ratio. Analysis result which had the closest level with 1:50 ratio was 1:60 ratio with 78.2769 μg/ml. However, 1:50 showed the highest water soluble protein content which used less solvent, making the extraction process using 1:50 ratio was more effective and efficient.

**Table 2. Results data of water soluble protein levels based on *Spirulina platensis* ratio: aquades**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Protein Content ± SD (μg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : 40</td>
<td>50.8560 ± 21.97304</td>
</tr>
<tr>
<td>1 : 50</td>
<td>85.4742 ± 38.02541</td>
</tr>
<tr>
<td>1 : 60</td>
<td>78.2769 ± 20.39331</td>
</tr>
</tbody>
</table>

Note: Data was taken from the average of three replications ± Standard Deviation.

Water Soluble Protein Analysis based on The Interaction of *Spirulina platensis*: Aquades Ratio and Incubation Time

Based on Table 4, it is shown that the difference in the ratio of *Spirulina platensis* and the different incubation times for each treatment affected the levels of water soluble proteins produced. Water soluble protein content from *Spirulina platensis* extraction was produced from two factors interaction, which was *Spirulina platensis*: aquades ratio with incubation time. DMRT analysis showed that p value was 0.000 or smaller than 0.005 (p< 0.05), resulting a significant difference between treatment interactions. 1:50 ratio and 3 hours incubation gave the highest level of water soluble protein content with 115.99 μg/ml.

**Table 4. Results data on measuring water soluble protein in *Spirulina platensis***

<table>
<thead>
<tr>
<th><em>Spirulina platensis</em> : Aquades</th>
<th>Incubation Time (hour)</th>
<th>Protein Content ± SD (μg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : 40</td>
<td>1</td>
<td>57.9937 ± 7.80056</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>23.9110 ± 9.61106</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>70.6633 ± 4.90641</td>
</tr>
</tbody>
</table>
Hedonic Test of Water Soluble Protein Application on Blueberry Juice Product

Figure 2 is the graphical representation of the hedonic test results. The concentration of water soluble protein added to blueberry juice includes treatment A (0%), treatment B (25%), treatment C (50%), treatment D (75%) and treatment E (100%). Appearance of blueberry juice with the addition of water soluble protein which has the highest value is in treatment A with a value of 7.53. This shows the value of 8 which means it is very much liked by the panellists. Treatment A with the addition of 0% water soluble protein has a good appearance.

In the colour parameters, the highest average value given by the panellists is in treatment A and D with a value of 7.03. This shows a value of 7 which means that treatments A and D have the colour preferred by the panellists. Treatment A with the addition of 0% water soluble protein has a purple colour produced from blueberries, whereas in treatment D it has blue-purplish colour due to the dominant addition of water soluble proteins produced from extraction Spirulina platensis contains dark blue.

The assessment of the aroma of blueberry juice with the addition of water soluble proteins is an assessment carried out based on the sense of smell. In the graph in Figure 2 shows the aroma parameter has the highest value of 6.87 in treatment D with the addition of 75% water soluble protein which means the aroma of blueberry fruit juice is favoured by panellists.

Assessment of taste parameters in blueberry juice is based on taste buds so the panellists are required to taste the product in order to provide an assessment. On the graph of the hedonic test the highest value is found in treatment D with a value of 6.70 which means that treatment D has a feeling that is favoured by panellists.

The hedonic test results on the texture parameters of blueberry juice which have been added to water soluble protein showed the highest value in treatment B with the addition of water soluble protein by 25%. Treatment B shows a value of 6.77, which means the texture of the preferred blueberry juice is treatment B. The average value of all parameters in the hedonic test shows numbers 6 and 7, which means that fruit juice which has been added to water soluble protein from the resulting Spirulina platensis and well received by panellists.

### Table 4. Results data on measuring water soluble protein in Spirulina platensis

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : 50</td>
<td>41.7557 ± 29.88771</td>
<td>98.6790 ± 17.13357</td>
<td>115.9880 ± 8.46986</td>
</tr>
<tr>
<td>1 : 60</td>
<td>54.7817 ± 10.11966</td>
<td>94.0393 ± 13.46156</td>
<td>86.0097 ± 9.46111</td>
</tr>
</tbody>
</table>

Protein Content Analysis on Blueberry Juice

Based on Table 5, it can be seen that the addition of different water soluble proteins to each treatment affects the protein content of the blueberry juice products produced. The highest protein content was obtained in treatment E, while the lowest was in treatment A. This shows that the higher the concentration of water soluble proteins added, the higher the protein content produced.
Table 5. Protein level test results of blueberry fruit juice with addition of water soluble protein from Spirulina platensis

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>Protein (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.45</td>
</tr>
<tr>
<td>B</td>
<td>4.82</td>
</tr>
<tr>
<td>C</td>
<td>5.24</td>
</tr>
<tr>
<td>D</td>
<td>6.71</td>
</tr>
<tr>
<td>E</td>
<td>7.68</td>
</tr>
</tbody>
</table>

**Discussion**

Different Spirulina platensis: Aquades Ratio against Water Soluble Protein

Data result analysis showed that there was a significant difference at the ratio of Spirulina with incubation time ratio, making them as generated water soluble protein content. Table 2 showed more aquades solvent used would make an increased product of water soluble protein. This was because Spirulina platensis content would be solved only at the polar soluble solvent for Spirulina platensis.

Solvent selection was very important, as it determines the bioactive compound which was taken in the extraction process. Extraction process included the maceration process, the larger ratio of simplicial against the extracting, the higher content result obtained.

Different Incubation Time against Water Soluble Protein Extraction Result

Data analysis of protein from Spirulina platensis water-soluble based on 1, 2, and 3 hours showed longer of incubation time would produce more water soluble protein. The treatment time of incubation for 3 hours has a value of 90.8870 μg/ml. According to Wang et al., longer extraction time would produce more time between solvent and main materials, making them into mass diffused precipitation until reaching a balance of excluding material extraction, thus incubation time influenced the extract production process obtained.

Interaction of Ratio and Incubation Time against Water Soluble Protein Content

The interaction of these two factors, namely the ratio of Spirulina platensis: aquades and incubation time showed significant difference on all treatments that produced water soluble protein. Table 4 shows that the treatment ratio of 1:50 with 3 hours incubation time had the highest water soluble protein content with 115.99 μg/ml. This research used aquades as a maceration solvent. Long and non-movement maceration process allowed many protein compounds got extracted.

Soaking process would crash the cell walls and membranes due to the difference pressure on the inside and outside of the cell. According to Safi et al., cell wall of Spirulina platensis had a characteristic that was fragile, as it was composed by the absence of peptidoglycan cellulose.

**Hedonic Test**

Hedonic test resulted blueberry fruit juices with addition of water soluble proteins a preferred mark from all panellists. All treatment showed blueberry juice with the addition of water soluble protein was acceptable by the panelists. Protein content on juice increased along with the increased protein concentration. According to Febriantiet al., protein content in drinks with protein added would be more appropriate for people who had food restrictions. People suffered kidney failure was more advisable to get the diet food by way of reducing the protein intake.

**Conclusions**

Different ratio, incubation time, and indicators between those two factors affected the water soluble protein content produced. Optimum ratio was observed at 1:50, while incubation time was observed at 3 hours incubation. The best protein content was also observed at the interaction of 1:50 ratio for 3 hours incubation.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

5. N. Seyidoglu, S. Inan, C. Aydin. Superfood and
Correlation between Intact Parathyroid Hormone Levels and Subperiosteal Erosion toward Phalanx Manus and Bone Specific Alkaline Phosphatase Level in Pre-dialysis Chronic Kidney Disease Patients

Djoko Santoso¹, Nurita Indarwulan¹, Nunuk Mardiana¹
¹Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

There is high prevalence of bone disease due to abnormalities of parathyroid hormone (PTH) in chronic kidney disease (CKD). The study aims to determine correlation between iPTH and subperiosteal erosion and b-ALP toward phalanx manus in pre-dialysis CKD patients. The study was used analytical observational research with cross-sectional design. The samples were 60 pre-dialysis CKD patients. iPTH levels was measured using ECLIA method and subperiosteal erosion on phalanx manus was assessed using X-ray. In additions, b-ALP levels were measured using ELISA method. The correlation between iPTH with subperiosteal erosion and b-ALP were analysed using contingency coefficient test. Median of iPTH level was 102.19 pg/ml (12.46-477.30 pg/ml). Subperiosteal erosion was found in 76.7% pre-dialysis CKD patients. Meanwhile, median of b-ALP level was 29.88 ng/ml (12.79-110.38 ng/ml). The contingency coefficient test of iPTH with subperiosteal erosion found r=0.103 and p-value=0.727. Meanwhile, contingency coefficient test of iPTH with b-ALP showed r=0.167 and p-value=0.424.

Keywords: b-ALP, Calcium, Chronic Kidney Disease, Diabetes Mellitus, Phosphorus.

Introduction

The complication of chronic kidney disease (CKD) is characterized by impairment in metabolism of mineral and bones and caused mineral and bone disorder in chronic kidney disease (CKD-MBD). CKD-MDB is describes a clinical syndrome that includes abnormalities of minerals, bone and vascular calcification due to CKD complications. The bone abnormalities in CKD patients contributed to high fracture risk and decrease the quality of life. This bone abnormalities is associated with secondary hyperparathyroidism with hyper parathyroid bone diseases in response to hypocalcaemia⁴⁻⁵. More than 50% of patients with CKD with decrease in glomerular filtration rate which up to 50% have bone histologic abnormalities, although clinical sis not shown any bone abnormalities symptoms⁴.

The bone abnormalities lead potential which caused complication such as fractures, bone pain, bone structural abnormalities, muscle weakness, tendon rupture and extracellular calcification especially cardiovascular calcification¹⁻³. These conditions will degrade quality of life and increasing morbidity and mortality of CKD patients⁶⁻⁷. The incidence rate of fracture is quite high at 2.9 per 1000 patients among CKD patients undergone dialysis in CKD patients undergone dialysis and occurs in younger age than normal population⁸⁻⁹.

Meanwhile, the pelvis fracture in dialysis patients had 2 times mortality risk higher than normal population¹⁰. The fracture incidence in CKD patients have high economic and clinical implications which medical costs for fracture range from $14,000 to $20,000 per incidence¹⁰.

Meanwhile, the pelvis fracture in dialysis patients had 2 times mortality risk higher than normal population¹⁰. As glomerular filtration rate in CKD, hyperphosphatemia and decreased production of 1.25 (OH)² D will cause hypocalcaemia.
The hypocalcaemia presence will lead to increment parathyroid hormone (PTH) or secondary hyperparathyroidism that will trigger bone resorption to release calcium and phosphate\(^{12}\). Hyperparathyroidism lead to increase bone turnover by increasing both bone resorption and formation. Bone specific alkaline phosphatase (b-ALP) describes the osteoblasts activity because osteoblast activity is intertwined during bone turnover and b-ALP represents an overall bone turnover. The combination of b-ALP and iPTH will increase sensitivity, specificity and predictive value in diagnosing bone turnover types\(^{13}\). Bone mediated osteoclast resorption of secondary hyperparathyroid leads to radiographically visible cortical depletion as subperiosteal erosion. The subperiosteal erosion is most consistent radiological feature of secondary hyperparathyroidism. The subperiosteal erosion presence is correlated with PTH serum and b-ALP\(^{12,14,15}\).

The renal osteodystrophy (ROD) is bone abnormality in CKD patients. The ROD is required non-invasive diagnostic techniques included bone radiology as well as biochemical markers for bone turnover such as iPTh and b-ALP\(^{16}\). iPTh showed good correlation with bone turnover rate\(^1\). PTH is major regulator of bone metabolism affecting bone formation and resorption which can affects changes in bone turnover. The study aims to determine correlation between iPTh and subperiosteal erosion toward phalanx Manus and correlation between iPTh and b-ALP in pre-dialysis CKD patients.

### Methodology

The study was used analytical observational research with cross-sectional design. The study was conducted at Dr.Soetomo Hospital, Surabaya between August 2015 and October 2015. The study population were all non-dialysis CKD patients who treated in Dr. Soetomo Hospital, Surabaya. The samples were 60 samples who met the inclusion criteria and selected by consecutive sampling method. The data was analysed Kolmogorov Smirnov test with SPSS program. The correlation between iPTh and subperiosteal erosion and b-ALP were analysed using contingency coefficient test.

### Result and Discussion

In Table 1, there were 51 male respondents (85%) and 9 female respondents (15%) involved in this study. The youngest respondent was aged 27 years old and oldest respondent was aged 65 years old. The mean of body mass index (BMI) was 23.42 kg/m\(^2\) with standard deviation of 3.49 kg/m\(^2\). The BMI was considered in normal BMI range. Meanwhile, mean of upper arm circumference was 27.11 cm with standard deviation of 3.85 cm which considered as normal upper arm circumference. There were 41 respondents (68.3%) suffered diabetes mellitus (DM) and 19 respondents were non-DM.

### Table 1. Respondent characteristic distribution

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total (n=60)</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td>52.12± 7.93</td>
</tr>
<tr>
<td>Gender (%)</td>
<td>Male</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>9</td>
</tr>
<tr>
<td>Body mass index (kg/m(^2))</td>
<td></td>
<td>23.42±3.49</td>
</tr>
<tr>
<td>Upper arm circumference (cm)</td>
<td></td>
<td>27.11± 3.85</td>
</tr>
<tr>
<td>Comorbid disease</td>
<td>Diabetes mellitus (DM)</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Non DM</td>
<td>19</td>
</tr>
</tbody>
</table>

The corrected calcium serum mean was within normal range. The phosphorus serum level and glomerular filtration rate (GFR) values had abnormal data distribution. The corrected calcium serum had mean of 8.58 mg/dl with standard deviation of 0.63 mg/dl. The median of corrected calcium serum was 8.60 mg/dl with minimum and maximum were 6.9 mg/dl and 10.16 mg/dl.

### Table 2. Special of characteristic of study subjects

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean±SD</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected calcium serum (mg/dL)</td>
<td>8.58±0.63</td>
<td>8.60</td>
<td>6.9-10.16</td>
</tr>
<tr>
<td>Phosphorus serum (mg/dL)</td>
<td>4.82±1.88</td>
<td>4.50</td>
<td>2.9-13.7</td>
</tr>
<tr>
<td>LFG (ml/minute/1.73m(^2))</td>
<td>20.60±17.86</td>
<td>12.50</td>
<td>2-60</td>
</tr>
<tr>
<td>Albumin (mg/dL)</td>
<td>3.89±0.34</td>
<td>3.95</td>
<td>3.2-4.6</td>
</tr>
<tr>
<td>GDA (mg/dL)</td>
<td>156.38±76.50</td>
<td>127.5</td>
<td>67-430</td>
</tr>
<tr>
<td>t-ALP (U/L)</td>
<td>86.23±33.89</td>
<td>78</td>
<td>39-209</td>
</tr>
</tbody>
</table>
The phosphorus serum had mean and standard deviation were 4.82 mg/dl and 1.88 mg/dl. In additions, mean GFR were 20.60 ml/minute/ 1.73m² with standard deviation of 17.86 ml/minute/ 1.73m². The median of albumin, GDA and t-ALP levels fell within normal range as shown in Table 2.

Table 2. Special characteristic distribution

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean±SD</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected calcium serum (mg/dL)</td>
<td>8.58±0.63</td>
<td>8.60</td>
<td>6.9-10.16</td>
</tr>
<tr>
<td>Phosphorus serum (mg/dL)</td>
<td>4.82±1.88</td>
<td>4.50</td>
<td>2.9-13.7</td>
</tr>
<tr>
<td>GFR (ml/minute/ 1.73m²)</td>
<td>20.60±17.86</td>
<td>12.50</td>
<td>2-60</td>
</tr>
<tr>
<td>Albumin (mg/dL)</td>
<td>3.89±0.34</td>
<td>3.95</td>
<td>3.2-4.6</td>
</tr>
<tr>
<td>GDA (mg/dL)</td>
<td>156.38±76.50</td>
<td>127.5</td>
<td>67-430</td>
</tr>
<tr>
<td>b-ALP (U/L)</td>
<td>86.23±33.89</td>
<td>78</td>
<td>39-209</td>
</tr>
</tbody>
</table>

The median was iPTH serum ranges were shown in Table 3. In this study, iPTH serum had abnormal data distribution with median of 102.19 pg/ml. The minimum and maximum of iPTH level were 12.46 pg/ml and 477.3 pg/ml as shown in Table 3.

Table 3. Median and range of iPTH

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>Median</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPTH (pg/mL)</td>
<td>60</td>
<td>102.19</td>
<td>12.46-477.30</td>
</tr>
</tbody>
</table>

There were 46 respondents (76.7%) had subperiosteal erosion of positive phalanx Manus and 14 respondents (23.3%) had subperiosteal erosion of negative phalanx Manus. In Table 4, there was no significant difference in corrected calcium serum, phosphorus serum, GFR, iPTH and b-ALP levels between respondents with positive subperiosteal erosion than respondents with negative erosion.

Table 4. Distribution erosion based on iPTH level

<table>
<thead>
<tr>
<th>Subperiosteal erosion</th>
<th>iPTH level (pg/ml)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;150</td>
<td>150-300</td>
</tr>
<tr>
<td>Positive erosion</td>
<td>31</td>
<td>10</td>
</tr>
<tr>
<td>Negative erosion</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>12</td>
</tr>
</tbody>
</table>

In this study, b-ALP serum level had abnormal data distribution with median value of 29.88 ng/ml. The minimum and maximum range were 12.79 ng/ml and 110.38 ng/ml. Meanwhile, there was no significant correlations between iPTH levels with subperiosteal erosion , p= 0.727>0.05. In additions, there was no significant correlation between iPTH level with b-ALP levels, p=0.424>0.05.
Table 5. Result of contingency coefficient level of iPTH with b-ALP level

<table>
<thead>
<tr>
<th>iPTH level</th>
<th>b-ALP level</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>0.167</td>
</tr>
<tr>
<td>P</td>
<td>0.424</td>
</tr>
<tr>
<td>n</td>
<td>60</td>
</tr>
</tbody>
</table>

Discussion

In this study, mean age of respondents were higher. The mean age among respondents was 52.12 years which highest number of respondents were between 50 years and 65 years. Besides, more male respondent than female with ratio of 5.6:1.

The ratio of DM patients and non-DM was 2:1 and most respondents had BMI was in normal ranges. In additions, highest number of respondents were in stage 5 of CKD with GFR median of 12.5 ml / min / 1.73m². The iPTH mean was lower due to higher number of respondents with CKD, older age and lower phosphorus level. The glycaemic status is one determinant of iPTH level in CKD patients with DM. The mechanism caused low iPTH levels in DM patients with Advanced Glycation End Products (AGEs) that inhibited PTH secretion.

The pathophysiology of decrement of iPTH levels together with increased age is still unclear. Kiss et al.17 found negative association between iPTH with age which lower phosphorus serum levels found in older age respondents. These results suggested lower phosphate intake among older patients than younger patients. Besides, older CKD patients had lower parathyroid gland response which correlated with greater uremic toxin accumulation at older age18.

Furthermore, iPTH levels had abnormal data distribution so the median iPTH was used to analyze the data. The ROD histopathology in pre-dialysis CKD patients is unknown than dialysis CKD patients due to lack of skeletal symptoms and definitive indication for bone biopsy. Most common ROD histology type in CKD patients was hyperthyroid bone disease. Early detection for bone abnormalities in ROD is important such as presence of bone related hyperparathyroidisresorption. Subperiosteal resorption was earliest pathognomonic feature of hyperparathyroidism.

In this study, 76.7% of respondents had experienced subperiosteal erosion which detected with plain manus images. High bone erosion due to increased bone resorption caused by secondary hyperparathyroidism included osteoporosis and mixed bone diseases19.

The PTH measurement had several limitations, so alternatives approach was introduced using bone-specific alkaline phosphatase (b-ALP) which is directly related to bone turnover and bone histometric. The b-ALP is an ectoenzyme located on the osteoblast membrane13.

iPTH level were important predictor of bone histology type and used as non-invasive tool to distinguish between high turnover bone disease with low turnover bone disease or normal bone.

The statistical test showed no correlation between iPTH levels with subperiosteal erosion in phalanx manus. In CKD, bone metabolism disorders often caused imbalance between resorption and formation. There was increment in bone resorption included secondary hyperparathyroidism, osteoporosis, mixed bone diseases and β2- macroglobulin osteoarthropathy. The bone lesions showed decreased bone resorption was found in low-binding diseases correlated aluminum, osteomalacia, adynamic osteopathy and extracellular calcification20. The bone abnormalities condition was obtained in CKD patients and found these bone abnormalities affected bone erosion image.

The X-ray helped identified bone characteristics but did not distinguish bone abnormalities type. The subperiosteal resorption was radiological feature of hyper parathyroid bone disease which found in osteomalacia found in CKD patients21. In this study, most respondents were stage 5 of CKD patients leads to increase of IL-1, IL-6, TNF-α and growth factor cytokines. Bone histologic changes in secondary hyperparathyroidism was commonly found in stage 3 or 4 of CKD patients who had lower plasma PTH.

Although, PTH had important effect in bone turnover, PTH serum concentration did not considered as substitute marker for bone turnover. The iPTH level in diagnosed bone disease was higher in dialysis patients than pre-dialysis patients.In this study, there was no significant correlation between iPTH level and b-ALP levels which indicated presence of other factors. The correlation between b-ALP and iPTH represented an uncoupling between bone formation and resorption. Both
iPTH and b-ALP did not correspond to an increment in bone turnover. Low plasma b-ALP also represented decreased in b-ALP synthesis by uremic osteoblasts. Poor osteoblast response to low PTH and b-ALP plasma resulted down regulation of PTH receptors in uremic cells. The osteoblast function defect can be obtained in the respondents which affect the b-ALP synthesis.

**Conclusion**

In conclusion, there was no significant correlation between iPTH levels with subperiosteal erosion and b-ALP. The subperiosteal erosion of phalanx manus and b-ALP levels cannot describe bone due to iPTH abnormalities. The study need to be done to determine bone abnormalities in CKD with using the bone biopsy and other factors such as cytokines IL-1, IL-6, TNF-α and growth factor, calcitriol level, PTH receptor level, vitamin D receptor, calcium-sensing receptor and other bone abnormalities.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Erythropoietin Potential as an Antiapoptotic Agent in ISCEMIC Stroke using Unilateral Right Common Carotid Artery Occlusion (RUCCAO) Model

Junaidi Khotib¹, Ika Ayu Mentari², Mahardian Rahmadi³, Suharjono⁴

¹Faculty of Pharmacy, Airlangga University, Surabaya 60115 Indonesia

Abstract

Ischemic stroke is insufficient or interrupted of blood flow to an area of the brain, typically caused by blockage of an artery and can result in brain damaged. This study was aimed to investigate the efficacy of Recombinant Human Erythropoietin (rHuEPO) as a neuroprotection (antiapoptotic agent) on rat with ischemic stroke induced by right common carotid artery occlusion. Animals were divided into five groups included sham group, ischemic stroke group and treatment group of rHuEPO. rHuEPO was administered intravenously once a day for 7 days at dose 1000, 5000, 10000 IU/Kg a week after induced by right common carotid artery occlusion surgery. The repair of brain damage was evaluated by Y maze for cognitive repair, ladder rung walking and forelimb asymmetry test for motor repair, measured on day 0, 1, 3 and 7. The result showed that treatment with rHuEPO significantly enhanced spatial memory at 5000 and 10000 IU/Kg in day 7 compare to ischemic group (p = 0.0260, p = 0.0286 respectively) and improved motoric function in day 7 compare to ischemic group (p = 0.0064, p = 0.0102 respectively). rHuEPO significantly reduce area infarct at 1000 IU 5000 IU and 10000 IU/Kg compare to ischemic group (p = 0.0265, p = 0.0016 p = 0.0024 respectively). Furthermore, there were significant differences on caspase 3 expression in each group.

Keywords: Anti Apoptotic, Caspase 3, Ischemic Stroke, rHu Erythropoietin

Introduction

Ischemic stroke is a condition where the blood vessels of the brain experience blockage (lack of blood supply) caused by the presence of thrombus or embolism. Death in ischemic stroke involves two processes namely necrosis and apoptosis. Both of these processes depend on the duration of exposure and ischemic intensity experienced. In focal ischemia, necrosis is the main cause of cell death in the core, and in the core area is surrounded by penumbra, where neurons mainly die by apoptosis, which is governed by a programmed cell death mechanism, because the apoptosis process is regulated by certain signal elements so that it takes time for neuronal cell death there is therefore an opportunity to save the penumbra area from ischemic stroke¹.

The lack of supply of blood flow and energy to the brain, which triggers at least some mechanisms that cause cell death, namely excitotoxicity and ion imbalance, inflammation and apoptosis². Ischemia and reperfusion trigger a complex cascade of brain injury mediated by overloaded intracellular glutamate and Ca²⁺. Depletion of oxygen and glucose in cells causes a decrease in the Na⁺ -K⁺ -ATPase function which will cause Na⁺ concentration in cells to increase so that cell swelling arises¹.

To avoid greater neuronal cell death, a neuroprotectant is needed. Erythropoietin is thought to be neuroprotectant by increasing cell resistance through activation of phosphatidylinositol 3-kinase / Akt and the NFkB pathway resulting in regulation of antiapoptotic proteins and blocking the activation of specific death cell proteases leading to apoptosis, Sharawy et al.³ had mentioned erythropoietin effect as neuroprotectant by targeting ROS through activation of antioxidant enzymes and their ability to reduce TNF.
Based on the description above, it is necessary to conduct research on the potential of erythrolein to reduce the number of cell deaths caused by ischemic stroke. It was proved that this was done by testing in mice that were conditioned to suffer from ischemic stroke by using the right unilateral common carotid artery occlusion (rUCCAO) experimental model. rUCCAO (right unilateral common carotid artery occlusion) is a method of inducing stroke by binding or blocking the right carotid of the communist artery, where the artery directly drains blood to the brain, for 90 minutes, this method will produce hypoxic conditions in brain tissue. To see the improvement of the improvement of ischemic stroke using erythropoietin, it will be seen the extent of infraception, cellular changes, caspase 3 expression in the brain and seeing improvements in memory and motor function in experimental mice.

Methodology

This experimental research was conducted at the Animal Pharmacy Laboratory of Airlangga University started from February to August 2017. The study design used was randomized design, pretest-posttest and controlled group study. As many as 30 Wistar breed mice aged 8-10 weeks were randomly divided into five groups included sham group, stroke model group and rHuEPO administration group with three different doses of 1000, 5000 and 10000 IU kg/BW. Prior to stroke induction, baseline measurements were taken for behavioral tests (Y-maze, ladder rung walking, Forelimb used Asymmetry Test -FUAT) which aimed to determine the cognitive and motor function of mice before and after induction. Administration of rHuEPO in the treatment group was given for 7 consecutive days while the sham group and stroke model group were given normal saline for 7 consecutive days. Observation of behavior was carried out on days 1, 3 and 7. Termination was carried out on the 14th day by looking at the area of infarction using TTC staining, observation of the cellular changes in brain tissue using hematoxylin eosin staining, and observation of caspase 3 activities in the brain with immunohistochemical staining using antibodies caspase 3. The experimental data were then statistically analyzed with ANOVA, post hoc Bonferroni’s and post hoc Tukey’s HSD in order to identify the differences between the experimental groups.

Result and Discussion

FUAT method was tested using a cylinder task to observe the effect of rHuEPO toward motor function improvement. The purpose of this method was to determine the tendency of the mouse to use ipsilateral or contralateral when the mouse stands in a transparent plastic cylinder, mice that experience injury to their brains will experience contralateral malfunction if the ipsilateral part is induced by stroke. To find out the differences between groups, it was analyzed using one way ANOVA analysis, Tukey’s HSD post-hoc presented in Table 1. Table 1 showed a significant difference in the percentage of FUAT between each group with p = 0.0324 using the Two Way Anova test with a 95% confidence interval. The effect of rHuEPO on the improvement of motor function by FUAT method exhibited a significant difference on the 7th day between the sham vs stroke model (p = 0.0139), the stroke vs stroke model group + EPO 5000 IU / kgBW (p = 0.0064), the stroke vs stroke model group + EPO 10000 IU / kgBW (p = 0.0102) using the Tukey’s HSD post hoc test.

<table>
<thead>
<tr>
<th>Group</th>
<th>Forelimb Use Asymmetry Test (FUAT) day (% + SEM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Sham</td>
<td></td>
</tr>
<tr>
<td>Stroke model</td>
<td>25.66±7.22</td>
</tr>
<tr>
<td>Stroke + EPO 1000 IU/kgBW</td>
<td>27.69±2.56</td>
</tr>
<tr>
<td>Stroke + EPO 5000 IU/kgBW</td>
<td>22.55±6.04</td>
</tr>
<tr>
<td>Stroke + EPO 10000 IU/kgBW</td>
<td>24.04±3.71</td>
</tr>
<tr>
<td></td>
<td>22.00±3.16</td>
</tr>
</tbody>
</table>

Note: * significant difference
Data in Table 2 displayed a significant difference in the area of infarction between each group with a value of \( p = 0.0004 \) using the one way ANOVA test at 95% confidence interval. Using post hoc Tukey’s HSD, it is found that the effect of rHuEPO on infarct area showed significant differences between the stroke vs sham model groups (\( p = 0.0006 \)), stroke vs. Stroke + EPO 1000 IU/ kgBW (\( p = 0.0265 \)), stroke vs. Stroke + EPO model groups 5000 IU/ kgBW (\( p = 0.0016 \)), stroke vs. Stroke + EPO 10000 IU/ kgBW model group (\( p = 0.0024 \)).

**Table 2. Mean infarction area for each group (n = 3) after receiving treatment with rHuEPO dose of 1000 IU, 5000 IU and 10000 IU / kgBW for 7 days**

<table>
<thead>
<tr>
<th>Group</th>
<th>Area (mm)±SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sham</td>
<td>0.00±0.00</td>
</tr>
<tr>
<td>Stroke model</td>
<td>5.62±0.38</td>
</tr>
<tr>
<td>Stroke + EPO 1000 IU/kgBW</td>
<td>3.27±0.73</td>
</tr>
<tr>
<td>Stroke + EPO 5000 IU/kgBW</td>
<td>0.66±0.66</td>
</tr>
<tr>
<td>Stroke + EPO 10000 IU/kgBW</td>
<td>0.90±0.90</td>
</tr>
</tbody>
</table>

Figure 1 shows the cross section of brain organ. Based on Figure 1, the brain was taken and then prepared histochemically with hematoxylin-eosin staining. The images showed morphological changes that occur in neuron cell bodies in the thalamus area of the brain after receiving rHuEPO treatment at 1000 IU, 5000 IU and 10000 IU / KgBW doses once a day for 7 days. The body shape of a dead neuron cell indicated that the nucleus of the cell is seen to saturate its boundaries irregularly and is dark-colored in contrast to the living neuron cells which are still visible in the nucleus and children of the cell nucleus and the shape of cells that look brighter than dead cells.

![Figure 1. Cross section of brain organ with hematoxylin-eosin staining (a) sham group (b) stroke model group (c) stroke + EPO 1000 IU / kgBW (d) stroke + EPO 5000 IU / kgBW (e) stroke + EPO 10000 IU / kgBW](image)

To determine the occurrence of caspase 3 expressions in the mouse’s brain after the administration of rHuEPO in the condition of ischemic stroke, mice from each sham group, stroke model group, and treatment group were operated. The brain was taken and then prepared by immunohistochemistry with caspase antibody 3. In Figure 2 it can be seen that immunoreactive cells were clearly depicted as cells that absorb medium to strong
intensity brown color in the stroke model group, also seen quite dramatic changes in the cell image irregular shape with a smaller size.

Thalamus area that is not expressed by caspase 3

Caspase 3 expression is colored in light brown or old in the brain area of the thalamus

Figure 2. Caspase 3 expression in the mice brain try with caspase 3 antibody (a) sham (b) stroke model group (c) stroke + EPO 1000 IU / kgBW (d) stroke + EPO 5000 IU / kgBW (e). stroke + EPO 10000 IU / kgBW

Discussion

Inducing ischemic stroke models using the rUCCAO (right unilateral common carotid artery occlusion) method, the rUCCAO method was chosen because it was easy to implement and not complicated. The principle of this method was to inhibit blood flow to the brain by clamping the common carotid artery using a bulldog clamp, clamping takes place for 90 minutes, the communal carotid artery was located adjacent to the trachea. Brain ischemia causes gradual changes in neuronal cells included first stage of decreased blood flow, reduction of oxygen levels which results in energy failure resulting in terminal depolarization and failure of ion homeostasis. The second stage of failure is ion homeostasis, the third stage of inflammation and fourth stage of apoptosis.

The initial step of surgery is administration of anesthesia (ketamine 80 mg / kgBW and xylazine 10 mg / kgBW). Ketamine is a mixture of a depressant (NMDA antagonist) and analeptic (one of which is by increasing the binding of AMPA receptors) as its molecular action, with a mechanism like this it will be difficult to achieve full anesthesia and ketamine is an unfavorable muscle relaxation agent, it is necessary to add another agent, xylazine. Xylazine is an α-2 adrenergic agonist whose effects produce interactions between the central and peripheral α-2 adrenoreceptors which result in muscle relaxants. Both of these drugs are complementary combination agents between analgesic and muscle relaxation effects, ketamine provided an analgesic effect while xylazine causes good muscle relaxation.

Mice which have been given antithesis are then dissected by making an incision 2-3 cm long in the middle of the neck, then pinching the common carotid artery blood vessels located adjacent to the trachea. The reason for the use of clamping using bulldog clamp rather than binding with nylon thread is the strength of inhibition of blood flow in the common carotid artery using a stronger clamp and uniform release time compared to using a thread.

The day before surgery, observations were performed on the cognitive and motor functions of each treatment group. The cognitive functions were tested using the Y-maze test. Y-maze also known as spontaneous alternation is a method used to measure spatial working memory, short-term memory and general locomotor activity. There are three arms on the Y-maze tool, where the principle of this test is that each mouse will be placed in one of Y-maze’s arms then the mouse will move to the other arm until the mouse’s tail enters the arm, the movement of the mouse to each arm will be recorded and tested for 5 minutes. Each arm will be labeled A, B and C, for a score of 1 if the mouse enters the ABC arm, if the mouse moves from ABA then the score is 0, the
overall score will be changed in percentage form\textsuperscript{13,14}.

The next test was the measurement of infarct area. Slicing brain organs using brain blockers with bregma -2 interaural cutting position. The choice of Bregma-2 because in the position of Bregma -2 has a significant infarct compared to the position of the other Bregma. In the brain, the Bregma -2 regions is dominated by the hippocampus, hypothalamus and thalamus region where this area affects cognitive function\textsuperscript{9}. The central role of the limbic system included memory, learning, motivation and emotions. A brain structure that includes a system limbic include the amygdala, hippocampus, parahipocampus gyrus, cinguli gyrus, fornix, hypothalamus, thalamus, dentatus gyrus and entorhinal cortex.

The mechanism of cell death caused by ischemic stroke involved two death processes included necrosis and apoptosis, necrosis is the main cause of death in the core and in the core area is surrounded by penumbra, where nerve cells (neurons) mainly die by apoptosis and are regulated by cell death mechanisms programmed, because the apoptotic process is regulated by certain elemental signals so that it takes time for neuronal cell death, therefore there are opportunities to save the penumbra area from cell death due to ischemic stroke\textsuperscript{1}.

Apoptosis caused by ischemic stroke is divided into two intrinsic and extrinsic pathways, the intrinsic pathway caused by a lack of oxygen and glucose supply in cells causes a decrease in Na\textsuperscript{+}-K\textsuperscript{+}-ATPase function and neurons become depolarized causing “neuronal excitability” and massive release glutamate, when glutamate binds to the NMDA receptor causing an increase in Ca\textsuperscript{2+} in the cytosol (due to the opening of Ca\textsuperscript{2+} ion channels). This increase triggers translocation of Bax (proapoptotic agent) to the mitochondrial membrane and joins the PTE (permeability transition pore complex) resulting in increased mitochondrial membrane permeability and cytochrome C release\textsuperscript{1,9}.

The ability of erythropoietin to protect and prevent the brain from cell death can be seen from histology and immunohistochemical results. The results of brain histology using hematoxylin eosin (HE) staining showed the normal number of neuron cells in the sham group, and the rHuEPO treatment group was more compared to the stroke model group which can be seen in Figure 6 more visible cells in the ischemic stroke group dark color and shows no cell nucleus. HE stains is often used and able to smear the core and cytoplasm, HE staining using 2 kinds of staining substances, namely hematoxylin which functions to dissolve the nucleus of the cell and give blue color and eosin which is used to penetrate the cell cytoplasm\textsuperscript{15}.

Immunohistochemical testing of brain organs from each sham group, stroke model group, and treatment group was to determine caspase 3 expression which is caspase effector (caspase executor) one of the molecular regulators of apoptosis. The method used in this examination is a quantitative method, where the number of apoptotic cells in each sample was determined by adding up all apoptotic cells found in 5 (five) different fields of view, at 400 times the magnification.

The suspected mechanism for erythropoietin as an antiapoptotic agent is when EPO binds to EPO receptors in the brain (EPO receptors found in neurons, astrocytes, and microglia) will activate several pathways such as phosphatidylinositol 3-kinase / Akt and the NFκB pathway\textsuperscript{1,12,13}. Wu et al.\textsuperscript{14} stated that Akt is a survival agent and is activated by phosphorylation of ser473 via the PI3K (phosphatidylinositol 3-kinase) pathway which is considered as one molecule that can prevent the apoptosis process, the main regulatory mechanism of this enzyme is phosphorylation: Akt is activated while GSK-3β is inhibited by phosphorylation, inactivation of GSK-3β can cause prevention or reduction of apoptosis in neurons. GSK-3β participates in the mechanism of apoptosis GSK-3β has been shown to induce caspase-3 activation and activate pro apoptotic tumor suppressor genes, p53\textsuperscript{15,16}. GSK-3β also promotes the activation and translocation of members of the Bcl-2 pro apoptotic family, Bax in mitochondria thereby inducing cytochrome c release\textsuperscript{17,18}. Meanwhile, the activation of the NFkB path in his study states that the activation of NF-KB serves as the main mechanism to protect cells against the stimulus of apoptosis by promoting the expression of anti-apoptosis proteins such as XIAP (X-linked inhibitor of apoptosis proteins) and cIAP2 (c-inhibitor of apoptosis-2) in which cIAP2 can suppress the expression of caspase 3 and 9. Chong et al.\textsuperscript{19} stated that exogenous administration of erythropoietin can increase the expression of Bcl-xL (anti-apoptotic agent) in cerebral endothelial cells.

**Conclusion**

Overall results indicated that the administration of rHuEPO had neuroprotectant potential as an antiapoptotic agent in ischemic stroke with the administration of rHuEPO in line with efforts that continue to be developed.
as the latest strategy in the treatment of ischemic stroke. For this reason, it is necessary to further study the mechanism and other markers related to inhibition of brain cell death due to rHuEPO.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


The Effect of Finasteride on Vascular Endothelial Growth Factor (VEGF) Expression in the Prostate Tissue and Bleeding Volume during Trans Urethral Resection of the Prostate (TURP)

Kartiko Sumartoyo¹, Budiono², Ketut Sudiana³, Soetojo¹, Sunaryo Hardjowijoto¹

¹Department of Urology, Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia, ²Department of Public Health, Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia, ³Department of Anatomical Pathology, Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

This study was evaluated the efficacy of Finasteride as a neoadjuvant therapy in reducing bleeding volume in patients with Benign Prostatic Hyperplasia (BPH) and urinary retention with prostate volume 30-50 mL who underwent Trans Urethral Resection of the Prostate (TURP). The study respondent consisted 26 patients with BPH and urinary retention who planned to undergo TURP. The study sample was randomly split into 2 treatment groups, 13 patients received Finasteride 5 mg once daily for 2 to 4 weeks before the operation and 13 others defined as control group. The therapy efficacy is evaluated by comparing the Haemoglobin pre-post operation difference, bleeding volume, bleeding volume per gram prostate tissue resected and the Vascular Endothelial Growth Factor (VEGF) expression within the prostate tissue. The treatment group indicated difference Haemoglobin between pre and post operation and average bleeding volume has less significant than the control group. The treatment group showed less amount of bleeding volume per gram of prostate tissue resected compare to control group. The treatment group also found significant lower VEGF expression within prostate tissue than the control group. This study demonstrated Neoadjuvant therapy with finasteride 1 x 5 mg for 2 to 4 weeks can reduce the VEGF expression in prostate tissue and reduce bleeding volume due to TURP.

Keywords: Benign Prostatic Hyperplasia (BPH), Bleeding Volume, Finasteride, Urinary Retention, Vascular Endothelial Growth Factor (VEGF)

Introduction

Benign prostatic hyperplasia (BPH) is a benign tumor that is most commonly suffered by men. The risk of men suffering from symptomatic BPH in the age between 50 - 59 years old is 25% and increases to 43% in men over 60 year old of age¹.

BPH is one of the causes of the lower urinary tract symptoms (LUTS) in elderly men, whereas in the group of men less than 30 year old benign prostate enlargement has not occurred so that LUTS complaints related to BPH have never been found².

Bleeding is a major complication of TURP. During the 1970 - 1990 periods, TURP-related transfusion rates were reported at 20%³. The development of technology in high frequency generators and improvement of techniques in continuous-flow instruments, video-TURP significantly reduced the number of transfusions due to bleeding in TURP where in 2000 and after that the transfusion rate was less than 10%³. Heavy bleeding with an open venous sinus is a risk factor for TUR syndrome. Other risk factors related to the incidence of TUR syndrome are length of time of surgery, large prostate volume and a history of smoking. Approximately 2 - 5% of bleeding due to TURP requires transfusion, while the percentage of need for transfusion in open prostatectomy is higher, between 7-14%³. S. Madersbacher et al.⁴ found an incidence of TURP-related transfusions of 8.6%.
The mechanism of action of Finasteride in reducing or preventing bleeding is estimated through its role in reducing the influence of androgens, which with no DHT formation will result in barriers to various growth factors including Vascular endothelial growth factor (VEGF). VEGF is androgen dependent and has a very important role in the process of angiogenesis and regulation of prostate blood flow. Reduced DHT will reduce VEGF expression so that the process of angiogenesis is inhibited and there is also a decrease in prostate blood flow and eventually the density of blood vessels in the prostate tissue will decrease.

With this circumstantial a study was conducted on the effect of Finasteride 5 mg once daily for 2-4 weeks before surgery on the amount of bleeding and VEGF expression in prostate tissue in BPH retention patients undergoing TURP compared without Finasteride as a control group.

**Methodology**

This study is an experimental study with a post-test only controlled group design with variable measurements such as Hb before TURP, Hb after TURP, Irrigation Hb and weight of VEGF prostate resection. The respondents were the patients who were diagnosed with Benign Prostate Hyperplasia (BPH) with indications that the TUR Prostate was performed at RSUD Dr. Soetomo Surabaya. There were 26 patients involved in this study. The sample study was randomly and equally split into two groups. One group is treated daily with 5 mg of Finasteride. Meanwhile, others group did not treat with Finasteride. The respondents were under observation for 2 to 4 weeks after treatment until the TURP operation.

The study was conducted during April 2014 to September 2014 with 26 patients who met the inclusion criteria. 26 patients were obtained after selected among the 39 BPH patients with urinary retention who undergone TURP surgery at RSUD Dr. Soetomo Surabaya. There were 26 BPH patients with urinary retention who met the inclusion criteria were grouped randomly into two groups. In additions, 13 patients who received 5 mg of finasteride therapy once a day for 2-4 weeks before TURP surgery as a treatment group and another group of 13 patients did not receive therapy as a control group. All patients in the treatment group completed therapy 2-3 weeks. The average duration of taking medication was 15.6 days (14-20 days) before surgery. There are no patients who meet the criteria for drop out. Unpaired t-test is used for parametric data in this study. While, Mann Whitney test is sued to test the different from non-parametric data. The data analysis is performed using SPSS V.21 with a significance level of 0.05.

**Result and Discussion**

All data were tested for normality by the Shapiro-Wilk test and the result is shown in Table 1. The results of normality test showed that the variables of age, preoperative hemoglobin, initial systolic blood pressure, the amount of bleeding, the weight of the resected prostate tissue and the duration of operation were normally distributed with a significance value of more than 0.05. Thus, the statistical test used is parametric statistics. An independent t test is used to test the differences between finasteride and control groups. There were two types of independent t tests, the pooled or equal variance t tests were assumed and the t separate or equal variance test is not assumed. The selection of the type of independent t test is based on homogeneity between groups. Levene test is used for homogeneity test, if the Levene test significance value is above 0.05. The data of both homogeneous groups and the t test used are pooled or equal variance t test assumed. Whereas if the significance value of the Levene test is below 0.05, the data of the two groups is not homogeneous and the t test used is the t separate or equal variance test not assumed.

Whereas in prostate volume variables, a long history of urinary retention, pre-postoperative hemoglobin difference, Hb irrigation, volume of irrigation, bleeding per gram of resection tissue, mean systolic blood pressure and VEGF expression of prostate tissue were abnormally distributed with a significance value of less than 0.05. Since the data is not normally distributed, the statistical tests used are non-parametric statistics. Different tests for non-parametric data used Mann-Whitney test. For the variable residual history, history of hematuria, urine culture and postoperative hematuria is nominal data so that the Chi square test is used.
Table 1. Data normality with the Shapiro-Wilk test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kolmogorov-Smirnov</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>Df</td>
</tr>
<tr>
<td>Age</td>
<td>.146</td>
<td>26</td>
</tr>
<tr>
<td>Retention</td>
<td>.266</td>
<td>26</td>
</tr>
<tr>
<td>Hb_pretest</td>
<td>.110</td>
<td>26</td>
</tr>
<tr>
<td>HB_posttest</td>
<td>.152</td>
<td>26</td>
</tr>
<tr>
<td>difference_Hb</td>
<td>.224</td>
<td>26</td>
</tr>
<tr>
<td>Hb_irrigation</td>
<td>.245</td>
<td>26</td>
</tr>
<tr>
<td>Vol_irrigation</td>
<td>.251</td>
<td>26</td>
</tr>
<tr>
<td>bleeding</td>
<td>.141</td>
<td>26</td>
</tr>
<tr>
<td>Resection</td>
<td>.112</td>
<td>26</td>
</tr>
<tr>
<td>bleeding_gram</td>
<td>.234</td>
<td>26</td>
</tr>
<tr>
<td>initial systole</td>
<td>.176</td>
<td>26</td>
</tr>
<tr>
<td>final systole</td>
<td>.107</td>
<td>26</td>
</tr>
<tr>
<td>flat systole</td>
<td>.130</td>
<td>26</td>
</tr>
<tr>
<td>operation duration</td>
<td>.153</td>
<td>26</td>
</tr>
<tr>
<td>VEGF</td>
<td>.196</td>
<td>26</td>
</tr>
</tbody>
</table>

Ten patients in the treatment group and 9 patients in the control group were examined for PSA serum. Patients who were not tested for serum PSA due to age>70 year old and no suspicion of malignancy on physical examination were found. Table 2 shows the mean serum PSA value in the treatment group was 6.53 ng /mL while the control group was 10.14 ng /mL. Six of the 10 patients in the treatment group were treated with prostate biopsy with the guide trans rectal ultrasonography (TRUS), in the biopsy control group performed in 6 of 9 patients who were examined for serum PSA. Biopsies in these 12 patients were carried out between 1-2 months before surgery. The results of biopsy pathology examination in both groups did not show any prostate malignancy.

Table 2. Description of PSA examination, serum PSA values and prostate biopsy in both groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Finasteride, n: 13</th>
<th>Control, n: 13</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Min</td>
</tr>
<tr>
<td>PSA (ng/mL)</td>
<td>10</td>
<td>1.71</td>
</tr>
<tr>
<td>Biopsy</td>
<td>6</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3 showed the information of residual cases, history of hematuria and urine culture for finasteride group and control group. In the finasteride group there were 2 cases of residual BPH while in the control group only 1 case of residual BPH. TURP’s operating history in the three residual cases is more than 7 years. There were 4 treatment group patients who had a history of hematuria before surgery and 3 patients in the control group. All patients were examined for urine culture, there were significant amounts of germs in urine in 6 treatment group patients and 7 in the control group, the rest were patients with sterile urine culture. The most
common type of germs found is Klebsiella pneumonia, in 4 (30.7%) patients. The differences in the three variables in the two study groups were not statistically significant (p> 0.05).

Table 3. Residual cases, history of hematuria and urine culture in both groups

<table>
<thead>
<tr>
<th></th>
<th>Finasteride, n: 13</th>
<th>Control, n: 13</th>
<th>X²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riw. Residual (+/-)</td>
<td>2</td>
<td>1</td>
<td>0.539</td>
</tr>
<tr>
<td>Riw. Hematuria (+/-)</td>
<td>4</td>
<td>3</td>
<td>0.658</td>
</tr>
<tr>
<td>Urine culture (+) (cfu/mL)</td>
<td>6</td>
<td>7</td>
<td>0.695</td>
</tr>
</tbody>
</table>

Discussion

Finasteride is a 5α-reductase type 2 enzyme inhibitor that converted testosterone to 5α-dihydrotestosterone (DHT). With a single dose of 5 mg Finasteride will rapidly reduce serum DHT levels, consequently blood flow and vascular endothelial growth factor (VEGF) expression will decrease and inhibit the process of angiogenesis, so that the density of the vascular tissue or microvessel density (MVD) will decrease5,8, 9, 10. Through this mechanism Finasteride can work to reduce hematuria due to BPH and bleeding in prostate surgery3.

The dose of finasteride given was finasteride 5 mg once daily for 14-20 days (2 - 3 weeks) before TURP surgery. One day before surgery the patient will be examined for serum hemoglobin and repeated after surgery while still in the recovery room. Blood mixed with irrigation fluid in containers was taken for inspection of irrigation Hb after the operation was completed. The volume of irrigation, blood pressure during surgery, the incidence of hematuria and postoperative retention clots in the room were recorded. Prostate scraping tissue was sent to the Anatomy Pathology section to find out histopathology and for VEGF expression examination.

Neoadjuvant treatment effect by administering finasteride 5 mg once daily for 14-20 days (2 to 3 weeks) before surgery in this study was found to have significantly lower pre-postoperative Hb (g/dL) than the control group (ρ <0.001 ) with a median of 0.2 and 0.3 respectively. The mean of bleeding (mL) of treatment group was significantly smaller compared to the control group which are 260.65 ± 94.86 and 523, 39 ± 156.49 with ρ = 0.014. The amount of bleeding per 1 gram of tissue (mL/g) resected of treatment group was significantly smaller than the control group (ρ <0.001) with a median of 9.53 and 21.25 respectively. The presence of VEGF expression in prostate tissue (per 15,625 μm2) in treatment group was significantly lower compared to the control group (ρ <0,0 001) with a median of 1.9 and 6.5 respectively.

The amount of bleeding in TURP is estimation because blood coming out of the prostate tissue mixes with irrigation fluid so that the exact amount of bleeding cannot be measured precisely. Estimation of the amount of bleeding in the study was obtained by calculating a formula involving variable Hb irrigation, serum Hb preoperative and the volume of irrigation used during surgery. The formula for estimating the amount of bleeding (mL) equal to the multiplication of volume of irrigation (mL) with the fraction of Hb irrigation (g/dL) and the preoperative blood hemoglobin (g/dL)11.

In this study, the range of Hb irrigation was 0.1 - 0.3 gr/dL in the finasteride group and 0.2 - 0.6 gr/dL in the control group with statistically significantly different. Irrigation HBs obtained from blood samples mixed with irrigation in containers, factors for fluid homogenization and sensitivity of examination instruments affect differences in results. Not all other researchers have included the results of irrigation Hb examination. The volume of irrigation fluid used will affect the final result of the amount of bleeding but not all other studies include the amount of irrigation fluid used.

The mean number of hemorrhages of the finasteride group in this study was 260.65 ± 94.86 mL, significantly different compared to controls. Bleeding parameters in Donohue’s study differed from this study and other studies, in which Donohue defined bleeding with the loss of gram Hemoglobin in irrigation fluid. However, different tests with the control group had the same results as this study, which was the amount of bleeding was significantly different compared to the control group.

Bleeding per gram of resected prostate tissue is assessed as a more appropriate criterion for assessing and comparing the amount of bleeding that occurs. In this
study, bleeding per gram of resection was significantly different compared to controls, median 9.53 (5.03 - 11.39) vs. 21.25 (9.72 - 28.20), mean 8.77 ± 2.17 vs 19.67 ± 5.82; ρ <0.001.

Besides, the study also found the VEGF expression of finasteride group was lower than the control group with median 1.9 (1 - 3.2) vs 6.5 (3.9 - 8.7) mean 1.81 ± 0.7 vs 6.34 ± 1.27 per area of 15,625μm², this difference was statistically significant (ρ <0.0001). VEGF-index is obtained from the number of cytoplasmic cells that react positively multiplied by the intensity score of the positive. This index is measured on the grounds that VEGF staining is difficult to uniform in each cell.

In this study VEGF expression was the mean of the positive number of VEGF expression of cytoplasmic cells of prostate tissue seen with a 100x, 400x magnification microscope and counted in graticule in each area of 15,625μm² in 10 random locations on each slide. However, the difference in measurements did not influence the results of the study because the same results were obtained where the VEGF expression of the finasteride group was lower than the control group.

The results and several other studies above were in agreement with the theory that VEGF is androgen-dependent, where the administration of finasteride will inhibit the formation of DHT, an androgen that is stronger than testosterone, which will reduce VEGF production. Reduction in VEGF will inhibit the process of angiogenesis so that blood flow and density of blood vessel tissue (microvessel density / MVD) in prostate tissue will be reduced\(^2,5,6,10\).

**Conclusion**

In conclusions, this study indicated a significant decrease in Hb difference before and after TURP, significant decrease in the amount of bleeding, decrease in the amount of bleeding per gram of prostate resection tissue and decrease in VEGF expression in prostate tissue treatment with neoadjuvant therapy with 1 x 5 mg finasteride for 2-3 weeks before surgery in BPH retention patients.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

---

**References**

Effectiveness and Mechanism of Action of Vanadyl Sulfate in Increasing Pancreatic β Cell Proliferation of DM Mice Due to Streptozotocin Induction

Khoirotin Nisak¹, Junaidi Khotib¹
¹Faculty of Pharmacy, Airlangga University, Surabaya 60115 Indonesia

Abstract

Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia as a result of damage to insulin secretion, insulin action, or both. Vanadyl sulfate is one of the form of vanadium which has begun to be used to treat diabetes in humans. In this study, investigation on the effectiveness of vanadyl sulfate in increasing pancreatic β cell proliferation of diabetes mice due to streptozotocin induction. There were 30 healthy mice were subjected to this experimental study. Findings from this experiment proved that administration of vanadyl sulfate at various doses can significantly increase the amount of pancreatic β cell proliferation and eventually reduced blood glucose levels in a meaningless manner. However, those mice that administrated of vanadyl sulfate at a dose of 30 mg / kgBW had a higher amount of Langerhans Islet than those in the vanadyl sulfate group at a dose of 5 mg / kgBW and 100 mg / kgBW. Similar observations were obtained for the Ki-67 expression. The highest Ki-67 expression was obtained at a dose of 30 mg / kgBW but it decreased with a dose of 100 mg / kgBW of vanadyl sulfate.

Keywords: Diabetes Mellitus, Langerhans Islet, Streptozotocin, Vanadyl Sulfate

Introduction

Vanadium has been used since 1800 because of its nutritional benefits, in people with diabetes mellitus (DM), atherosclerosis, anemia and so on¹. In the 1900s, vanadium began to be used to treat DM in humans. The mechanism of vanadium action is that it can mimic the work of insulin so that stimulation of glucose uptake, glycogen synthesis, glucose oxidation in adipose, hepatocytes in an in vitro trial². In vitro and in vivo studies have shown that vanadium has the effect of insulin on the liver, skeletal muscle, and fat tissue both in humans and animal models²³. Studies have also reported the effects of glucose reduction due to vanadium salts, making them potential agents for blood glucose control purposes¹⁵.

The development of DM therapy since the last 2 decades has led to efforts made to induce pancreatic β cell regeneration. These efforts are carried out both by using stem cells and developing compounds that can induce pancreatic β cell proliferation⁶⁷. One of the compounds used is vanadyl sulfate. Vanadyl sulfate is a compound that has the potential to be used in the development of DM drugs because it can induce pancreatic β cell proliferation, this is evidenced by studies that have been conducted. In a study conducted by Missaoui et al.⁸ results were obtained that vanadyl sulfate can induce β cell proliferation in both normal and diabetic experimental animals.

In line with the latest direction of DM therapy development and has been widely researched for the past 20 years namely by induction of β cell proliferation using both stem cells and compounds that can induce proliferation, this study is expected to provide a mechanism description of the effect of vanadyl sulfate in increasing pancreatic β cell proliferation of DM in mice due to streptozotocin(STZ) induction.
Methodology

This study was conducted at the Animal Laboratory of the Faculty of Pharmacy, Airlangga University, Anatomical Pathology Laboratory, Faculty of Medicine and Dr.Soetomi RSU Diagnostic Center (GDC) Building. The animals test used were mice (Mus musculus) obtained from Gajah Mada University, Yogyakarta. The albino male mice, derived from one strain (BALB/c), healthy, no congenital abnormalities and had normal random blood glucose levels), male sex (age 8-10 weeks, body weight 25-30 grams), adapted for 14 days before being used for experiments. The 30 mice were kept in the cage throughout the experimental period at a constant room temperature of 25 ± 1 °C.

Before giving the mice vanadyl sulfate, the blood glucose reading were taken. On the first day of the experiment all the mice (except normal control) were induced intra peritoneally with streptozotocin dose of 100 mg / kgBW which was made in citrate buffer of pH 4.5 to induce the occurrence of DM. Followed by induction of the second dose 50 mg / kgBW on day 14. The blood glucose of the mice was evaluated on days 0, 7, 14, and 21. Those mice that experience DM had blood glucose levels> 300 mg / dl. When DM conditions occur at the time of blood glucose measurement, mice are then grouped into 5 random groups (control, healthy mice-no DM, mice with DM and vanadyl sulfate treatment group at a dose of 5 mg / kgBW, 30 mg / kgBW, and 100 mg / kgBW). For the treatment group, the mice were given vanadyl sulfate suspension for 7 days orally. Whereas in the control group, given CMC Na 0.6%. On day 8, after administration of vanadyl sulfate suspension, the mice were sacrificed by the cervical dislocation method, then surgery and removal of pancreatic tissue of mice from each group.

Histochemically, cross-sectional preparation of pancreatic tissue is performed with fuchsine aldehyde staining to observe the morphological characteristics, the number of Langerhans islets, and the number of pancreatic β cells of the mice. Results of the immunohistochemical examination are determined by Ki-67 antibody. To compare the differences in blood glucose levels of mice between normal groups, control of diabetes and treatment, one-way ANOVA test was carried out. Meanwhile, the effect of vanadyl sulfate at various doses observed on day 2, day 4 and day 8 after treatment, the One-Way ANOVA statistical test and followed by post-hoc Tukey’s HSD were done.

Result and Discussion

Table 1 presented blood glucose reading of the mice after consuming vanadyl sulfate for a week. From the table, the vanadyl sulfate could reduced blood glucose levels in DM mice. The results of measurement of blood glucose levels in groups of mice who developed DM and received vanadyl sulfate treatment at a dose of 5 mg / kgBW, 30 mg / kgBW, or 100 mg / kgBW showed decrement in blood glucose levels along with increased vanadyl sulfate doses compared to the DM group who only given 0.6% CMC Na solution orally.

| TABLE 1. Characteristics of blood glucose levels in different animal groups |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|
| Group                          | Blood glucose level (mg/dL ± SE) |
|                                | Post STZ ± SE   | Day 2 ± SE      | Day 4 ± SE      | Day 8 ± SE      |
| Mice + DM                      | 413.00 ± 50.97 | 552.83 ± 30.55  | 493.83 ± 40.71  | 471.5 ± 49.05  |
| Mice + DM + VS 5 mg/kgBW       | 343.00 ± 47.08 | 414.17 ± 81.28  | 431.5 ± 50.10   | 369.17 ± 48.47 |
| Mice + DM + VS 30 mg/kgBW      | 444.17 ± 40.00 | 514.5 ± 29.09   | 363.33 ± 75.9   | 294.67 ± 73.68 |
| Mice + DM + VS 100 mg/kgBW     | 452.67 ± 106.36| 343.67 ± 177.41 | 269.2 ± 210.07  | 255.75 ± 229.64|

Statistical results showed that there were significant differences in the group as indicated by p = 0.0129 (p <0.05). In addition, there was a significant difference in blood glucose levels between normal animal groups and DM animal groups, but there were no significant differences in other groups. There was a trend towards a decrease in blood glucose levels as the dose of vanadyl sulfate increases.
Table 2. Tukey’s HSD post-hoc results on measurement of blood glucose levels

<table>
<thead>
<tr>
<th>Tukey’s multiple comparisons test</th>
<th>Significance</th>
<th>Adjusted P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal mice vs. DM mice</td>
<td>Yes</td>
<td>0.0073</td>
</tr>
<tr>
<td>Normal mice vs. 5mg/kgBW mice</td>
<td>No</td>
<td>0.1025</td>
</tr>
<tr>
<td>Normal mice vs. 30mg/kgBW mice</td>
<td>No</td>
<td>0.4375</td>
</tr>
<tr>
<td>Normal mice vs. 100mg/kgBW mice</td>
<td>No</td>
<td>0.7861</td>
</tr>
<tr>
<td>Normal mice vs. 5mg/kgBW mice</td>
<td>No</td>
<td>0.7489</td>
</tr>
<tr>
<td>Normal mice vs. 30mg/kgBW mice</td>
<td>No</td>
<td>0.2618</td>
</tr>
<tr>
<td>Normal mice vs. 100mg/kgBW mice</td>
<td>No</td>
<td>0.1904</td>
</tr>
<tr>
<td>5mg/kgBW mice vs. 30mg/kgBW mice</td>
<td>No</td>
<td>0.9025</td>
</tr>
<tr>
<td>5mg/kgBW mice vs. 100mg/kgBW mice</td>
<td>No</td>
<td>0.7548</td>
</tr>
<tr>
<td>30mg/kgBW mice vs. 100mg/kgBW mice</td>
<td>No</td>
<td>0.9937</td>
</tr>
</tbody>
</table>

Furthermore, One-Way ANOVA showed significant differences between normal mice group, DM, and treatment (p = 0.0065). The normal group of mice who did not get streptozotocin induction had an average number of Langerhans Islets of 8.00 ± 1.1 units and were significantly lower than the DM group to 3.78 ± 0.58 units (p = 0.0263). In the vanadyl sulfate group, the dose of 5mg / kgBW also showed a significant decreased compared to the normal mice group which indicated that the administration of vanadyl sulfate at a dose of 5mg / kgBW was not able to increase the amount of Langerhans Islet specified by its value which was not difference with DM mice (p = 0.9831).

Table 3. Average number of Langerhans Islets for each group (n = 6) after receiving treatment at a various dose for 7 (seven) days

<table>
<thead>
<tr>
<th>Group</th>
<th>Total Islet Langerhans (unit)</th>
<th>Average ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal mice</td>
<td>8.00 ± 1.1</td>
<td></td>
</tr>
<tr>
<td>DM mice</td>
<td>3.78 ± 0.58</td>
<td></td>
</tr>
<tr>
<td>DM+VS 5mg/kgBW mice</td>
<td>3.08 ± 0.44</td>
<td></td>
</tr>
<tr>
<td>DM+VS 30mg/kgBW mice</td>
<td>6.11 ± 0.89</td>
<td></td>
</tr>
<tr>
<td>DM+VS 100mg/kgBW mice</td>
<td>4.44 ± 0.61</td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 4, the mean scoring of pancreatic β cell counts in the normal mice group was 5.03 ± 0.26 units, significantly decreased in the DM mice group to 1.87 ± 0.43 units (p = 0.0001). The decreased in this number justified the effectiveness of streptozotocin in damaging β cells in the Langerhans Islet.

In the treatment group 5mg / kgBW, 30mg / kgBW, and 100mg / kgBW, there was a significant increase in the number of pancreatic β cells compared to DM mice (p = 0.0000). The administration of vanadyl sulfate caused an increase in the number of pancreatic β cells from 2.67 ± 0.24 units for a dose of 5mg / kgBW, increasing to 4.07 ± 0.18 units for a dose of 30mg / kgBW, and the largest increase is 4.27 ± 0.27 units at a dose of 100mg / kgBW.

Table 4. The mean number of pancreatic β cells in each group (n = 6) after receiving treatment for 7 (seven) days with different vanadyl sulfate dose

<table>
<thead>
<tr>
<th>Group</th>
<th>Total Islet Langerhans (unit) Average ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal mice</td>
<td>5.03 ± 0.26</td>
</tr>
<tr>
<td>DM mice</td>
<td>1.87 ± 0.43</td>
</tr>
<tr>
<td>DM+VS 5mg/kgBW mice</td>
<td>2.67 ± 0.24</td>
</tr>
<tr>
<td>DM+VS 30mg/kgBW mice</td>
<td>4.07 ± 0.18</td>
</tr>
<tr>
<td>DM+VS 100mg/kgBW mice</td>
<td>4.27 ± 0.27</td>
</tr>
</tbody>
</table>

Based on Table 5, Scoring results using the Allred method showed that administration of vanadyl sulfate at a dose of 5mg / kgBW, 30mg / kgBW, or 100mg / kgBW showed an increase in Ki-67 expression compared to the DM groups. From these calculations, the largest Allred score is obtained at a dose of 30mg / kgBW was 3.89...
± 0.25 units. This showed an increase in proliferation in β cells when compared with the DM group with a dose of 5 mg / kgBW or 100 mg / kgBW. The One-Way ANOVA test results on immunohistochemical observations with Ki-67 expression calculation showed that there were no significant differences between groups in Ki-67 expression (p = 0.0720). The mean expression of Ki-67 in the normal mice group was 4.06 ± 0.29 units and decreased not significantly in DM mice to 3.28 ± 0.18 units.

Table 5. Results of the Allred method scoring average for Ki-67 expression on Langerhans Islet in each experimental mice group (n = 6)

<table>
<thead>
<tr>
<th>Group</th>
<th>Allred Scoring (unit) Average ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal mice</td>
<td>4.06 ± 0.29</td>
</tr>
<tr>
<td>DM mice</td>
<td>3.28 ± 0.18</td>
</tr>
<tr>
<td>DM+VS 5mg/kgBW mice</td>
<td>3.67 ± 0.12</td>
</tr>
<tr>
<td>DM+VS 30mg/kgBW mice</td>
<td>3.89 ± 0.25</td>
</tr>
<tr>
<td>DM+VS 100mg/kgBW mice</td>
<td>3.33 ± 0.19</td>
</tr>
</tbody>
</table>

Discussion

Over the past 20 years, the development of studies on transcription control of genes involved in β cell proliferation in both humans and mice has been studied. Recently, progress has been made in the development of human embryonic stem (ES) cells and induced pluripotent stem (iPS) cells for the development of pancreatic β cell studies. Replacement or regeneration of pancreatic β cells is expected to counteract the DM process. New cells developed theoretically can counteract the progression of diabetes both in humans and in rodents. This concept has encouraged efforts in various research groups to make new human β cells use stem cells to transdifferentiate or reprogrammed non-β cells to β cells or to find macromolecules or fields for the development of other compounds that can induce human β cell proliferation.

In this study, after induction of streptozotocin blood glucose levels then checked every 7 days to see the increase in blood glucose levels. The occurrence of DM in experimental mice was not simultaneous, at 36% of all experimental groups experienced DM conditions on day 7, 52% of DM mice occurred on day 14, and 12% of experimental mice experienced DM on day 28. Experimental mice models with blood glucose checks every 7 days also reported by other studies. Variable results are estimated due to different individual response factors to streptozotocin, mice strain factors, or due to intraperitoneal delivery route factors. Streptozotocin injection in experimental animals is best done when fasting and streptozotocin animals are made new by dissolving them in citrate buffer pH 4.4 to 4.5. After mice have diabetes, a dose of 5 mg / kgBW, 30 mg / kgBW, or 100 mg / kgBW is given for 7 days and their blood glucose levels are measured. The statistical test showed that there were significant differences in the normal mice group and DM mice group, but there were no significant differences in the treatment group on different doses of vanadyl sulfate. From Table 1, there was a trend of decreasing blood glucose levels as the dose of vanadyl sulfate increased. Based on this result, it can be seen that the administration of vanadyl sulfate in the treatment group compared with the DM group was able to reduce blood glucose levels in mice, namely at a dose of 5 mg / kgBW decreased blood glucose from 430.00 ± 47.08 mg / dL to 369.17 ± 48.47 mg / dL, at a dose of 30 mg / kgBW there was a decrease in blood glucose levels from 444.17 ± 40.00 mg / dL to 294.67 ± 73.68 mg / dL (p = 0.2618), whereas at a dose of 100 mg / kg BW there was a decrease in blood glucose from 452.67 ± 106.36 mg / dL to 255.75 ± 229.64 mg / dL (p = 0.1904).

In Table 3 showed that there was no significant difference in the amount of Langerhans Islet in the administration of vanadyl sulfate at various doses compared to the DM group of mice. From these results, it can be observed that the administration of vanadyl sulfate at a dose of 30 mg / kgBW had increased amount of Langerhans Islet better than the dose of 100 mg / kgBW.

The results also indicated that there was a significant effect between the administrations of vanadyl sulfate at various doses with the number of pancreatic β cells, with an increase in the number of pancreatic β cells as the dose of vanadyl sulfate increases. From these results it can be concluded that administration of vanadyl sulfate can increase pancreatic β cell proliferation which is characterized by an increase in the number of pancreatic
β cells as vanadyl sulfate dose increases. Considering that the amount of Langerhans Islet did not increase significantly, it can be concluded that the pancreatic β cell proliferation process due to the effect of vanadyl sulfate is likely to occur due to hyperplasia or an increase in the number of pancreatic β cells.

Conclusion

Overall the results of this study indicated that administration of vanadyl sulfate has the potential to stimulate pancreatic β cell proliferation. Stimulation of pancreatic β cell proliferation with the administration of vanadyl sulfate is in line with continued efforts in efforts to stimulate pancreatic β cell proliferation as the latest strategy in the treatment of diabetes mellitus. The results of this study can be used as a reference for other researchers in terms of pancreatic β cell proliferation studies using Ki-67 proliferation markers, pancreatic β cells and number of Langerhans Islets that have been scaled using reliable Allred method. It is recommended that further research be carried out to examine the mechanism of pancreatic β cell proliferation due to the administration of vanadyl sulfate with other proliferative markers.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Differences of IPSS, Q Max and Prostate Volume Before and After Treatment with Combination of Dutasteride and Tamoxifen in BPH Patient without Urine Retention

Kurnia P. Seputra¹, Doddy M. Soebadi¹, Hedromartono Widayat¹, Widoda J. P.¹, Soetojo¹

¹Department of Urology, Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

Benign Prostate Hyperplasia (BPH) is the common benign enlargement that found in men who suffers from urinary difficulties and the incidence increases as they are getting older. This study compare the IPSS, Q max and volume of the prostate between pre and post treatment of 5α Deductase inhibitor and Tamoxifen in patients BPH without urine retention. About 40 patients who had been diagnosed BPH without urine retention is participating in this study. The study has classified them into 4 groups, each group contain of 10 patients and were given Tamoxifen, Dutasteride, Combination (Tamoxifen with Dutasteride) and Placebo. The collected data includes the IPSS, uroflowmetry and volume of the prostate before and after 3 months of treatment. The data is analyzed by SPSS 12. The obtained results show Q max and IPSS have significantly improved in Dutasteride and combination group. While, Tamoxifen treatment group shows no significant improvements in Q max and IPSS. All the treatment groups show significant decreasing of prostate volume except Placebo group.

Keywords: Benign Prostate Hyperplasia (BPH), Dutasteride, Lower Urinary Tract Symptom (LUTS), Placebo, Tamoxifen

Introduction

Urinary difficulties are a problem in older men. Although this has long been known by people but Benign Prostate Hyperplasia (BPH) has not been identified as a disease until the early 19th century. Only in the last decade, the information about epidemiology and the course of this disease has become popular¹. BPH is the common benign enlargement found in men, and the incidence is related to age. Symptoms that occur in BPH are known as Lower Urinary Tract Symptom (LUTS). It is estimated that nearly 50% of men in their lives experience symptoms of symptoms caused by BPH and 10% will develop into malignancy²,³.

In some developing countries, the death rate due to BPH has decreased. In the period 1950-1954 the highest mortality rate was found in Denmark, amounting to 22.9 out of 100,000 sufferers, while 17 of 24 countries had a mortality rate of 10 out of 100,000 people suffering from BPH. At General Hospital Dr. Soetomo, the incidence of BPH during the period January 2005 to December 2005 has found 123 BPH patients who underwent surgery for the Trans Urethra Resection of the Prostate (TURP). From the 123 patients with BPH, 70 patients with BPH were accompanied by urinary retention while the remaining 53 patients were BPH patients with LUTS. The prostate is composed of components of the stroma and epithelium, each or a combination of the two will produce BPH symptoms. Prostate growth regulation is influenced by intrinsic and extrinsic factors. Intrinsic factors are signals from within the prostate itself. While extrinsic factors consist of testis, systemic, environmental, and genetic factors⁴.

Current BPH treatment includes watchful waiting, medical therapy, conventional surgical therapy and minimally invasive therapy. In medical treatment or medicine, a lot of variations are given, starting from the alpha blockers, 5α reductase inhibitors, combination of both or by using phyto preparations. This study identify
the effect of Dutasteride on a 5 α reductase inhibitor (Dutasteride) and estrogen inhibitor (Tamoxifen) in BPH patients who experience LUTS, based on the International Prostatic Symptom Score (IPSS), Q max, and prostate volume.

**Methodology**

The experimental research was conducted with the pre and post-test control group design. The study respondents were BPH patients who experienced uncomplicated LUTS and visited the Urology Polyclinic, Dr. Soetomo Surabaya between August 2006 and January 2007. The respondents were examined for IPSS scores. The test on uroflowmetry and trans rectal ultrasonography or TRUS were examined at InstalasiInvasif Minimal Urogenital (IIU) at Dr. Soetomo Surabaya.

The sample sizes were determined with Rule of Thumb guideline with a total of 10 samples for each case and control group. Hence, total sample sizes were 40 samples which divided into four group randomly. First group were patients with BPH who experienced uncomplicated LUTS who were given Placebo for 3 months and evaluated for pre and post treatment, second group was patients with BPH who experience uncomplicated LUTS were given 5α reductase inhibitors (Dutasteride 0.5mg) for 3 months and evaluated pre and post treatment. Meanwhile, third group was patients with BPH who had uncomplicated LUTS who were given anti-estrogen (Tamoxifen 20mg) for 3 months and evaluated for pre and post treatment and fourth groups was patients with BPH who had uncomplicated LUTS given 5α reductase inhibitors (Dutasteride 0.5 mg) and anti-estrogen (Tamoxifen 20mg) for 3 months were evaluated pre and post treatment.

The dependent variables in this study were IPSS, uroflowmetry and TRUS. The independent variables were 5 α reductase inhibitor (Dutasteride) and anti-estrogen (Tamoxifen). Meanwhile, control variable was LUTS patients due to uncomplicated BPH. The IPSS score, Q max, and TRUS were calculated for pre and post of the study. SPSS program is used to analyze the collected data.

**Result and Discussion**

Table 1 showed there was an increment in Q max after Tamoxifen treatment from 7.75 +/- 3.5538 to 9.15 +/- 2.9448. The Q max increase of -1,400 was then tested by t test shows the t value of –1.416 and a significance of 0.190. There was no difference in uroflowmetry before and after Tamoxifen treatment. This also reflected there was an insignificant increase in Q max after treatment of Tamoxifen.

In Dutasteride treatment, there was an increase in Q max from 9.55 +/- 3.2793 to 15.12 +/- 4.3522. Q max increased by -5.57 and tested by t test showed the t value of -3.444 and a significance of 0.007. There was a difference in Q max before and after Dutasteride treatment. This result indicated there was a significant increment in Q max after Dutasteride treatment.

In combination (Tamoxifen and Dutasteride) treatment showed an increase in Q max from 6.55 +/- 2.5435 to 8.86 +/- 4.4475. The Q max increase of -2.31 was then tested by t test showed the t value of -2.752 and a significance of 0.022. There was a difference between Q max before and after combination (Tamoxifen and dutasteride) treatment. This result also showed there was a significant increase in Q max after combination (Tamoxifen and dutasteride) treatment.

The Placebo treatment showed decrement in Q max from 9.4 +/- 4.077 to 8.91 +/- 3.8731. The Q max decreased of 0.49 was t test showed t value of 2.784 and a significance of 0.021. Hence, there was a difference in Q max before and after giving Placebo treatment. Although the results of the t test shows a significant value, but decrease in Q max, so the Placebo treatment could not increase the Q max of LUTS patients with uncomplicated BPH.

**Table 1. T-test results of paired samples at Q max on Tamoxifen, Dutasteride, Combination and Placebo treatments**

<table>
<thead>
<tr>
<th>Group</th>
<th>Type</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Difference (Pre – Post)</th>
<th>t value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamoxifen</td>
<td>Pre</td>
<td>7.75</td>
<td>3.5538</td>
<td>-1.400</td>
<td>-1.416</td>
<td>0.190</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>9.15</td>
<td>2.9448</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 showed full results of the Wilcoxon Signed Rank Test. In the Tamoxifen treatment group, post IPSS score lower than pre-IPSS had 5 patients, then post IPSS higher than pre IPSS had 1 patient and equal IPSS between pre and post score is about 4 patients. This result indicated there was no difference in IPSS scores before and after Tamoxifen treatment since the significance level was more than 0.05.

The group that received combination treatment for post IPSS lower score than pre IPSS were 6 patients. There were 4 patients contributed by the equal pre and post IPSS score. Since the significance level is less than 0.05, thus there was a difference in IPSS scores before and after the combination treatment.

The group that received Placebo treatment found no patient for post IPSS score lower than pre IPSS. Whereas, the post IPSS score higher than pre IPSS were 2 patients and equal IPSS score between pre and post were 8 patients. Since the significance level is more than 0.05, thus there was no difference in IPSS scores before and after the Placebo treatment.

Table 2. Wilcoxon Signed Rank Test Results of the International Prostatic Symptom Score (IPSS) in Tamoxifen, Dutasteride, Combination and Placebo treatments

<table>
<thead>
<tr>
<th>Group</th>
<th>Negative rank</th>
<th>Positive rank</th>
<th>Tie</th>
<th>Z value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamoxifen</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>-1.633</td>
<td>0.102</td>
</tr>
<tr>
<td>Dutasteride</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>-2.887</td>
<td>0.004</td>
</tr>
<tr>
<td>(Tamoxifen and Dutasteride)</td>
<td>6</td>
<td>0</td>
<td>4</td>
<td>-2.449</td>
<td>0.014</td>
</tr>
<tr>
<td>Placebo</td>
<td>0</td>
<td>2</td>
<td>8</td>
<td>-1.414</td>
<td>0.157</td>
</tr>
</tbody>
</table>

\(^a\)IPSS post < IPSS pre

\(^b\)IPSS post > IPSS pre

\(^c\)IPSS pre = IPSS post

Table 3 showed there was a decrement in prostate volume after treatment of Tamoxifen from 40.124 +/- 7.9129 to 36.323 +/- 8.2573. The decrease in prostate volume of 3.801 was then tested by t test showed a value of 3.053 and a significance level of 0.014. Since the significance level is less than 0.05, thus there was a difference in prostate volume before and after Tamoxifen treatment. This result also reflected there was a significant decreased in prostate volume after Tamoxifen treatment.

The Dutasteride treatment showed decrease in prostate volume from 30.93 +/- 9.0031 to 24.506 +/- 7.3267. Decrease in prostate volume by 6.424 is calculated. The t test showed the t value of 3.292 and the significance level of 0.009. Since the significance level is less than 0.05, thus there was a difference in prostate volume before and after Dutasteride treatment. This result also meant that there was a significant decrease in prostate volume after Dutasteride treatment.
The Placebo treatment showed an increase in prostate volume from 32.42 +/- 9.5974 to 33.68 +/- 9.6177. Prostate volume increase of 1.260 and then tested by t test showed the value of 1.371 with significance level of 0.204. Since the significance level is greater than 0.05, thus there was no difference in prostate volume before and after the Placebo treatment.

Table 3. The results of t-test samples paired on prostate volume in Tamoxifen, Dutasteride, Combination and Placebo treatments

<table>
<thead>
<tr>
<th>Group</th>
<th>Type</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Difference (Pre – Post)</th>
<th>t value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamoxifen</td>
<td>Pre</td>
<td>40.124</td>
<td>7.9129</td>
<td>3.801</td>
<td>3.053</td>
<td>0.014</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>36.323</td>
<td>8.2573</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dutasteride</td>
<td>Pre</td>
<td>30.93</td>
<td>9.0031</td>
<td>6.424</td>
<td>3.292</td>
<td>0.009</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>24.506</td>
<td>7.3267</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combination (Tamoxifen and Dutasteride)</td>
<td>Pre</td>
<td>31.403</td>
<td>9.0031</td>
<td>4.623</td>
<td>3.257</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>26.78</td>
<td>7.3267</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Placebo</td>
<td>Pre</td>
<td>32.42</td>
<td>9.5974</td>
<td>-1.260</td>
<td>-1.371</td>
<td>0.204</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>33.68</td>
<td>9.6177</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

From this study, 3 months of Tamoxifen treatment showed the result increased in Q max of LUTS patients because of BPH, although it is not statistically significant (p> 0.05). The improvements that occurred were 1.4 cc / sec. The treatment period of 3 months may also affect the results of this study. Tewari A. et al. has found that there was no significant association with Q max changes with total prostate volume but found a significant relationship in the reduction of transitional zone volume and the ratio of prostate transitional zones with Q max improvement in finasteride therapy. Two components that played a role in the occurrence of LUTS were mechanical and dynamic components. Dynamic components were prostate growth and mechanical components are smooth muscles in the prostate and urethra.

The effect of Dutasteride on LUTS patients because of BPH showed a Q max improvement of 5.57 cc / sec and statistically significant (p <0.05). The previous studies had found a Q max improvement of 2.2 cc / sec and after 12 months giving finasteride 5 α reductase inhibitor, the uroflowmetry improvement is about 1.6cc / sec compared to Placebo treatment which is 0.7 cc / sec.

The combination effect of Dutasteride and Tamoxifen on Q max showed that uroflowmetry improved about 2.31 cc / sec, which based on the statistics approach that there was a significant improvement (p <0.05). The same behaviour also occurred in IPSS. In the combination (Dutasteride and Tamoxifen) group also found a statistically significant improvement (p <0.05). Tamoxifen worked by blocking estrogen receptors. Estrogen is known to suppress TGF β1 which functions to stimulate the apoptosis process. When the estrogen is blocked, the end result of the cell will be driven by TGF β1 to apoptosis. Likewise, Dutasteride works by inhibiting the enzyme 5α reductase inhibitor, which converts testosterone to dihydrotestosterone (DHT). DHT is what will stimulate prostate growth. If a blockade is done on these two hormones, there will be a decrease in prostate volume and there will be an improvement in the urinary stream even though study of Kaplan S. A. has obtains the relationship between prostate volume and urinary emission is still a question.

IPSS in the Tamoxifen group showed no statistically significant improvement (p> 0.05) in the LPS patients with BPS. From the 10 patients, there were improvements in IPSS in 5 patients, 1 patient did not experience improvement in IPSS, while the rest had
no improvement. This is consistent with the results of uroflowmetry in patients with LUTS because of BPH given Tamoxifen. Time of only 3 months treatment period may also influence the results of this study. Symptoms of LUTS in BPH may influence by prostate factors and other factors such as diabetes mellitus. In this study these factors were not excluded. Therefore, there could be no significant improvement in uroflowmetry due to this factor.

The Dutasteride shown significantly improve of IPSS (p <0.05). From 10 patients, there were improvements in IPSS in 9 patients and 1 patient with IPSS score did not experience improvement. This is agreed with the results of Q max where significant improvements are obtained. Dolder C.R. found that Dutasteride treatment can improve the symptoms of BPH and reduce the risk for urinary retention and surgery in patients.

In prostate volume, Tamoxifen turned out to have a significant decrease in prostate volume (p <0.05). The decrease is about 3.8 cc within 3 months. Liu J. et al. has found that Tamoxifen treatment can decrease the prostate cell proliferation that will decrease prostate volume. In vitro Tamoxifen treatment also affects the metabolism of testosterone, which is through induction of resistance to the activity of 5α reductase and 17β hydroxysteroid dehydrogenase in the prostate gland. Tamoxifen shifts the position of androgen from its bond with sex hormone binding globulin in the blood.

Prostate volume in the Dutasteride treatment group obtained a significant decrease of 6.424 cc and statistically obtained a significant value (p <0.05). Clark R.V. claimed that Dutasteride can reduce prostate volume up to 26% of the previous volume as this study show about 20.8%.

There was a decrease in prostate volume of 4.623 cc in 3 months of the combination of Dutasteride and Tamoxifen, and statistically there was a significant decrease (p <0.05). In Dutasteride treatment, the decrease occurred was 6.424 cc while in the Tamoxifen group shows the volume decrease was 3.8 cc. A clinical trial may need in order to determine the effectiveness and efficiency of all three.

In the Placebo group the results obtained were a decrease in Q max before and after Placebo treatment, which is statistically significant. While in prostate volume and IPSS, there were no statistically significant differences between before and after treatment.

Conclusion

In conclusions, there was significant difference in Q max before and after the combination of Dutasteride and Tamoxifen in patients with LUTS because of BPH. Besides, there were also significant differences in Q max in Dutasteride treatment. In contrast to the treatment of Tamoxifen there was a difference but not significant at Q max. In additions, there was a significant difference in IPSS before and after the combination of Dutasteride and Tamoxifen in patients with LUTS because of BPH. Similarly, the treatment of Dutasteride also had significant differences in IPSS. In contrast to the treatment of Tamoxifen there were no significant differences in IPSS. Besides, there was a significant difference in prostate volume before and after the combination of Dutasteride and Tamoxifen in LUTS patients because of BPH.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Effect of Erythropoietin Administration on Spermatogonium Amount, Sertoli Cell and Leydig on Rats Testis (Wistar Strain) After Vas Deferens Ligation Released

Muhammad Surya Negara¹, Soetojo¹, Doddy M. Soebadi¹

¹Department Urology, Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

The study aimed to determine the effect of Erythropoietin on spermatogonia number, Sertoli cells and Leydig cells in white rat Wistar strain testis after ligation vas deferens release. Twenty-four Wistar strain eats were grouped into four group. The control group only performed an orchiectomy for testicular examination, ligation group vas deferens, group performed release ligation of vas deferens and group performed release ligation of vas deferens and given EPO injection with dose of 1000 iu/kg BW intraperitoneally for a week (three times per week). The observation of spermatogonium, Sertoli cells and Leydig cells by determined amount on 5 cross sections of seminiferous tubules used 400x light magnificent microscope with Hematoxylin Eosin staining. The result showed ligation of vas deferens had significant decreased spermatogonia number and Sertoli cells (p<0.05). There was no significant difference Leydig cells number after ligation of vas deferens (p>0.05). Meanwhile, release ligation of vas deferens had no significant different in spermatogonia, Sertoli cells and Leydig cells with ligation of vas deferens group. Besides, treatment ligation of vas deferens release and an EPO injection for a week also no significant different in number compared ligation release group of vas deferens.

Keywords: Vasectomy Reversal, Reactive Oxygen Species (ROS), Erythropoietin, Spermatogonium, Sertoli Cell, Leydig cell

Introduction

Vasectomy is most reliable form of male contraception and estimated 40 million to 60 million men worldwide had undergone vasectomy. Even though, vasectomy is very effective method but various problem can arise related to unclear patient information before action, surgical procedures, post-operative follow up and success rate¹. Most common long term complications of vasectomy are scrotal pain with 1% reporting post-operative pain and spontaneous recanalization of vas deferens which occurred between 0.03% and 1.2% after vasectomy procedure was performed.

There were 2% men who had vasectomy choose to have vasectomy reversal because their desire to have children. The vasectomy reversal request are increased in men who undergo vasectomy at young age¹². Most men had vasectomy reversal will faced reducing in their semen quality and require additional reproductive techniques to achieve conception. The success rate in vasectomy reversal patients is around 90%. Longer interval from patient undergoing vasectomy to reversal vasectomy, success rate for pregnancy is also getting lower³.

There are many hypotheses mentioned that vasectomy will result in obstruction of vas deferens which increasing intratesticular pressure in testis and resulted decreasing in testicular blood pressure and increased oxidative stress in the testis⁴⁵⁶. Vasectomy will result in high hydrostatic pressure due to obstruction, excessive sperm accumulation and stimulate local inflammatory reaction process which is characterized by increment in leukocytes in sperm. The abnormalities of sperm in the seminiferous tubules which contribute to Reactive Oxygen Species (ROS) increment⁷.

Corresponding author:
Soetojo
E-mail: soetojo@fk.unair.ac.id
In contrast, vasectomy reversal will result in ROS increment which is greater than patients who do not have a vasectomy or those who have vasectomy. When vasectomy reversal, long standing chronic inflammatory process activates even greater leukocyte activity in the vas deferens. Besides, pre-existing immune mechanism which is formation of anti-sperm antibodies which stimulate another inflammatory reaction resulted in increment leukocyte activation. Reactive Oxygen Species (ROS) content in vasectomy reversal action is higher than for patients who have vasectomy resulting in disturbances in sperm motility and spermatogenesis.

There was decreased in Sertoli cells, spermatogonia and spermatids and increased in apoptosis in spermatogenesis process. Lue et al. indicated that testicles weight and testosterone hormone had no significant changes but spermatogonia number and Sertoli cells decrease significant after 6th weeks and tubular atrophy occurred at 12th weeks.

Erythropoietin (EPO) is most important growth factor produced in kidney and works on Erythroid progenitor cells in bone marrow to prevent programmed cell death and response to hypoxic conditions. In additions, Erythropoietin receptors in the body also found in the brain, liver, digestive system, lungs, testicles and Leydig cells. EPO can affect steroidogenesis of mouse testicular Leydig cells by stimulating testosterone production and EPO intravenously can increase testosterone production in renal failure.

Besides, Erythropoietin has function as anti-apoptosis, anti-inflammatory and antioxidant by inhibiting ROS. The EPO given to mice testes had improved morphological testicular structure and repair germ cells by reducing apoptosis process and preventing inflammatory process so that ROS process could be inhibited. EPO have benefits by increasing spermatogonia number, Sertoli cells and Leydig cells. Hence, EPO is expected to be alternative therapy for vasectomy reversal. The study aimed to determine the effect of Erythropoietin on spermatogonia number, Sertoli cells and Leydig cells in white rat Wistar strain testis after ligation vas deferens release.

**Methodology**

The study was used experimental study with post test only control group design used male Wistar white rats (Rattus norvegicus). In additions, the treatment was in form of vasectomy (ligation of vas deferens) which observed for seven weeks, release ligation and left for one week and EPO injection for one week (3 times per week). The effect on spermatogonia number, Sertoli cells and Leydig cells in the testes was observed after ligation of vas deferens.

In the study, a post-test only control group design study was used with assumption that variable measurement were only obtained after treatment and had criteria for random allocation. The sample used was Wistar strain of white rats (Rattus Norvegicus) which had criteria included aged between 10 weeks and 12 weeks, body weight between 150 gram and 200 grams, healthy and not disabled. The white rats was obtained from breeding laboratory at Faculty of Veterinary Medicine, Airlangga University.

The samples were divided into four groups randomly with random numbers. Overall samples were 36 Wistar strain (Rattus norvegicus). The treatment consisted 3 groups included one group treated with a vasectomy and observed for 7 weeks; one group with vasectomy and release ligation performed at 7th weeks and then observed for another one week and another group with vasectomy treatment and release ligation was carried out at 7th weeks and given EPO injection was give for one week (3 times per weeks).

The study was conducted at Reproductive Embryology section of Faculty of Veterinary Medicine, Airlangga University for experimental animal rearing places and Pathobiology section of Anatomical Pathology section of Faculty of Veterinary Medicine for anatomical pathology examination and immunohistochemistry of testicular tissue examined.

The independent variable was EPO administration in Wistar strain rats after release ligation of vas deferens. Meanwhile, dependent variables was spermatogonia number, Sertoli cells and Leydig cells and control variables included Wistar strain (Rattus norvegicus), rats age, weight, cage type, feed, temperature, air pressure, cage humidity, artificial reversal vasectomy by release ligation of vas deferens, vasectomy duration and EPO dose.

The normality and variance test were used as basis for determined hypothesis test to determine the differences in spermatogonia number, Sertoli cells and Leydig cells in the control group and treatment group. All
data process techniques were analyzed computerizable used SPSS software program.

**Result and Discussion**

The data was analyzed used One Way ANOVA test. The result showed there were significant differences in Sertoli cells in each group with p<0.05. The analysis continued with Post Hoc test to determine differences in each group. There was significant difference in Sertoli cells number in the control group compared to group who received vasectomy (p<0.05), where Sertoli cells number in the control group was higher than in vasectomy group. In this study, the vasectomy had reduced Sertoli cells significantly. Besides, group with release ligation and group with release ligation and EPO found did not significantly affected Sertoli cells number (p>0.05). In additions, group with release ligation and group with release ligation and EPO found that there was no significant difference compared group with only vasectomy. The group with release ligation of vas deferens was observed had lower Sertoli cell than group with vasectomy which is released by ligation.

**Table 1. Comparison of Post Hoc Tamhane analysis for Sertoli cells in each group.**

<table>
<thead>
<tr>
<th>Group comparison</th>
<th>Mean difference</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control vs vasectomy</td>
<td>10.43</td>
<td>0.00*</td>
</tr>
<tr>
<td>Control vs vasectomy+ release ligation</td>
<td>10.77</td>
<td>0.00*</td>
</tr>
<tr>
<td>Control vs vasectomy+ release ligation+ EPO</td>
<td>9.43</td>
<td>0.00*</td>
</tr>
<tr>
<td>Vasectomy vs vasectomy+ release ligation</td>
<td>0.33</td>
<td>1.00</td>
</tr>
<tr>
<td>Vasectomy vs vasectomy + release ligation +EPO</td>
<td>-1.00</td>
<td>0.98</td>
</tr>
<tr>
<td>Vasectomy +release ligation vs vasectomy+ release ligation+EPO</td>
<td>-1.33</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Based on Post Hoc test, there was significant differences in spermatogonia cells number in the control group compared to group with vasectomy (p<0.05). In additions, spermatogonia cells number in control group is higher than group with vasectomy. This result showed vasectomy had reduced spermatogonia cells number. Meanwhile, release ligation did not affect spermatogonia cells number as well as release ligation and EPO given with p<0.05. The group with release ligation had low spermatogonia number than group with vasectomy while group with release ligation and EPO given had higher number of spermatogonia cells than group with vasectomy and release ligation.

**Table 2. Comparison of Post Hoc Tamhane analysis on spermatogonia cells number in each group**

<table>
<thead>
<tr>
<th>Group comparison</th>
<th>Mean difference</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control vs vasectomy</td>
<td>15.97</td>
<td>0.00*</td>
</tr>
<tr>
<td>Control vs vasectomy+ release ligation</td>
<td>16.80</td>
<td>0.09*</td>
</tr>
<tr>
<td>Control vs vasectomy+ release ligation+ EPO</td>
<td>9.90</td>
<td>0.08*</td>
</tr>
<tr>
<td>Vasectomy vs vasectomy+ release ligation</td>
<td>0.83</td>
<td>1.00</td>
</tr>
<tr>
<td>Vasectomy vs vasectomy + release ligation +EPO</td>
<td>-6.06</td>
<td>0.42</td>
</tr>
<tr>
<td>Vasectomy +release ligation vs vasectomy+ release ligation+EPO</td>
<td>-6.90</td>
<td>0.82</td>
</tr>
</tbody>
</table>

The visualization of microscopic description of cross section of seminiferous tubule in control group is shown in Figure 1. The visualization of microscopic view of cross section of seminiferous tubule group rats is shown in Figure 2. As for vasectomy group and release for one week, its visualization is shown in Figure 3. Finally, for vasectomy group+ release of vas deferens+ one week IPO, its microscopic images is shown in Figure 4.
Figure 1. Microscopic description of cross section of seminiferous tubule in control group. Description: Blue arrow sowed Leydig cell. Green arrows indicated spermatocyte cells. The orange arrow showed spermatogonia cells. Red arrow indicated Sertoli cells. Black arrows showed spermatid cells.

Figure 2. Microscopic view of cross section of seminiferous tubule in 7 weeks vasectomy group rats.

Figure 3. Microscopic view of cross section of seminiferous tubules in 7 weeks vasectomy group and release for one week.

Figure 4. Microscopic description of cross section of seminiferous tubules in 7 weeks vasectomy group+ release of vas deferens+ one week IPO.
Discussion

A reversal vasectomy was an act of returning vasectomy by reconnected vas deferens either by vasovasostomy or vasoepididymostomy. The reversal vasectomy is usually performed in 2-6% men who had a vasectomy before. The success rates for reversal vasectomy were determined by several factors included duration between vasectomy and reversal vasectomy, operator skills and intra-operative and pre-operative factors. The patency rate and success of pregnancy after reversal vasectomy was around 97% and 76%. Meanwhile, between 3 years and 8 years intervals the patency and success rates were around 88% and 53%.

Vasectomy was resulted in high hydrostatic pressure due to the obstruction, excessive sperm accumulation and stimulated local inflammatory reaction process which characterized by an increment in leukocytes in the sperm and abnormality of sperm in seminiferous tubules that played a role in increased Reactive Oxygen Species (ROS).

The inflammatory process had increased leukocytes and secrete pro-inflammatory cytokines such as TNF-α, IL-6, IL-8, NF-κB and TGF-β which increased ROS and iNOS (Inducible Nitric Oxygen) activity species. In the testis, the cells expressed TNF-α receptors and IL-6 were sensitive to hypoxic conditions were spermatogonia. The leukocytes and IL-6 concentration in seminiferous tubules remained stable during release ligation of vas deferens treatment due chronic inflammatory process of vasectomy.

In this study, vasectomy significantly reduced spermatogonia and Sertoli compared to control group (p<0.05) because vasectomy in vas deferens tract was blocked so that obstruction occurred and there was an increase in intratesticular pressure in the testis. The inflammatory process had increased leukocytes and secrete proinflammatory cytokines such as TNF-α, IL-6 which mediator had bind to TNF-α receptors (TNF-αR) and IL-6-R found in spermatogonia. Chronic inflammatory reactions due to vasectomy obstruction caused an increment in macrophages resulted in leucocyte infiltration into the plasma seminal. The apoptosis activation process also increased ROS and NOS resulted in degeneration of the seminiferous tubules, the blood testicular barrier was damaged and spermatogonia number and Sertoli cells also decreased. Meanwhile, there was no significant difference in Leydig cells after vasectomy with control group (p>0.05). Naik et al. had stated vasectomy did not affect significantly in the FSH hormones, LH and testosterone while Leydig cells plays a role in producing testosterone. Leydig cells were interstitial compartment of testes along with macrophages and lymphocytes which were located in Leydig cells between seminiferous tubules.

In this study, the reversal vasectomy was analogized to release of vasectomy ligation since vasectomy had performed also an artificial vasectomy by double ligation of vas deferens of mouse testes for 7 weeks with non-absorbable threads and no any cutting either proximal to ligation of vas deferens or distal from ligation of vas deferens.

In group with vasectomy for 7 weeks and release ligation with left for one week, there was no statistically significant difference from spermatogonia number, Sertoli cells and Leydig cells with group with vasectomy for 7 weeks (p>0.05). The spermatogonia number, Sertoli cells and Leydig cells after release ligation of vas deferens had lower number than group with vasectomy. In reversal vasectomy, leukocytes and IL-6 in seminal plasma was remain stable due to chronic inflammatory vasectomy process and increased which affected ROS activities.

Furthermore, group with EPO injection after release ligation of vas deferens showed no significant difference in spermatogonia, Sertoli cells and Leydig cells compared to group with vasectomy. The number of spermatogonia cells, Sertoli cells and Leydig cells were observed increased on group with EPO injection after one week observation. EPO had function as an anti-inflammatory, anti-apoptotic and antioxidant which also known that there were EPO receptors in the testes.

Conclusion

In conclusions, Sertoli cells and spermatogonia number less than the control group. Meanwhile, Leydig cells number in vasectomy group was higher than control group. Sertoli cells, Leydig cells and spermatogonia in vasectomy and release ligation of vas deferens was higher compared group with vasectomy. Besides, Sertoli cells, Leydig cells and spermatogonia in vasectomy group and release ligation of vas deferens with EPO for one week also higher than group with vasectomy and release ligation of vas deferens. The administration
of EPO for one week did not affect spermatogonia, Sertoli cells and Leydig cells numbers in release ligation of vas deferens treatment.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Substitution of Rice Bran with Phytase Enzymes in Commercial Feed on the Performance of Broiler

Rahmasari Nur Azizah\textsuperscript{1}, Indah Mentari Lasunte\textsuperscript{1}, Mochamad Lazurdi\textsuperscript{1}, Budiarto\textsuperscript{1}, M. Anam Al Arif\textsuperscript{1}, Mirni Lamid\textsuperscript{1}

\textsuperscript{1}Faculty of Veterinary Medicine (FKH), Campus C Universitas Airlangga Surabaya, Jalan Mulyorejo, Surabaya, Indonesia

Abstract

The purpose of this study is to determine the substitution of rice bran with phytase enzymes in commercial feed on the performance of broiler. The experimental design used in this study was complete randomized design. Thirty five male broilers strain CP 707 were randomly divided into five treatments. The treatment consisted of: P0 = 100% commercial feed (control), P1 = 95% commercial feed + rice bran with phytase enzymes 5%, P2 = 90% commercial feed + rice bran with phytase enzymes 10%, P3 = 85% commercial feed + rice bran with phytase enzymes 15%, P4 = 80% commercial feed + rice bran with phytase enzymes 20%. Treatment was given to chickens aged 20 - 35 days. Carcass weight and abdominal fat was measured at 35 day of age. The results of data analyzed using Anova and Duncan Multiple showed that substitution of rice bran with phytase enzymes 15% in commercial feed affected weight gain, feed conversion, percentage of carcass and abdominal fat that give good performance broiler.

Keywords: Phytase Enzymes, Broiler, Weight gain, Feed conversion, Percentage of Carcass, Abdominal Fat.

Introduction

Feed costs in a livestock business, especially broiler, are the largest component in the total production costs that must be spent by farmers during the production process, which is around 60 - 70\textsuperscript{1}. Rice bran is one of the feed ingredients that are often used to fulfill broiler nutrition. By using rice bran in large quantities, the cost of broiler feed can be reduced, but the increase in the amount of rice bran in feed can also increase the content of phytate compounds while poultry does not have the ability to digest Phytate compounds due to the absence of phytase enzymes in the digestive system of poultry. Therefore, broilers need additional phytase enzymes in their feed to increase digestibility\textsuperscript{2}. Anti-nutrient substances (phytate) have a negative effect on nutrients absorbed because phytic acid will bind proteins and minerals that function for the growth of broilers\textsuperscript{3}.

In feed also need to be added supplements in the form of fish oil. Fish oil is a fat fraction obtained from fish extraction or as one of the byproducts of the fish canning industry produced due to heating and sterilization during the process\textsuperscript{4}. Lemuru fish oil can be added to feed broilers to meet high energy needs. Lemuru oil contains very high omega-3 unsaturated fatty acids so that it can be used as a broiler feed supplement\textsuperscript{5}. Meat with high cholesterol and fatty acid content can increase the risk of atherosclerosis. Feeding sources of unsaturated fats can reduce meat cholesterol levels\textsuperscript{6}. With that said, this study intends to investigate the effect of substitution of rice bran with phytase enzymes in commercial feed on the performance broiler.

Methodology

This research was conducted in June - August 2017 at the Faculty of Veterinary Medicine, Airlangga University in Surabaya. Feed processing and proximate analysis were carried out at the Animal Feed Laboratory of the Department of Animal Husbandry. Maintenance of experimental animals was carried out in experimental cages.
The materials used in this study were 35 male broilers of CP 707 age two weeks from PT. Charoen Pokphand. The commercial feed used is commercial broiler feed (BR1). Drinking water uses water mixed with vitamins as recommended. Lemuru fish oil is obtained from a distributor in Surabaya. Vitamins for broilers are obtained from poultry shops in Surabaya while phytase enzymes are obtained from single colonies of rumen isolates which have the highest phytase activity, Actinobacillus spp and Bacillus pumilus. As for the broiler immune system, the ND (Newcastle Disease) vaccine is applied by means of eye drops and gumboro which are applied by means of mixed feed. The tools used in this study are tools for making feed, digital scales, cage cleaning tools, battery cages made of ram wire and places to eat and drink made of plastic.

Rice was fermented for five days with a dose of phytase enzyme 0, 2, 4, 6, 8% which was diluted by adding 25% distilled water. All treatments were fermented for five days and after that a laboratory analysis was carried out to measure dry matter, organic matter, crude protein, crude fiber. According to Nugroho et al., the results of this experiment obtained the right level of phytase enzyme which is 6% for the preparation of broiler feed formulas which will be applied in vivo. Formulations to be given to broilers:

- P0: Commercial feed (BR1) (control)
- P1: Commercial feed (BR1) 95% + fermented rice bran 5%
- P2: Commercial feed (BR1) 90% + rice bran with 10% enzyme
- P3: Commercial feed (BR1) 85% + fermented rice bran 15%
- P4: Commercial feed (BR1) 80% + fermented rice bran 20%

All treatments were supplemented with 2% lemuru oil and the feed formula was made isoprotein. This study used a completely randomized design (CRD) method.

One week before the cage is used, the cage is cleaned then sprayed using disinfectant evenly. The eating and drinking equipment to be used is cleaned and then prepared in a cage. Incandescent lights are installed in the center of the cage. The broilers are put in the prepared cage. The sugar water is given to the broilers to restore the fluid to the body that was lost during shipping and prevent stress from occurring in the broilers. For two weeks, the broiler was given commercial feed, whereas in the third week was used for adaptation to the adjustment of the treatment. When vaccinated on the 4-day, the active vaccine was dripped in the eye and repeated on the 21st day by mixing it. The gumboro vaccine is given at the age of 14 days by mixing it with drinking water.

Broiler feed is given in ad libitum in the form of mash. Drinking water that has been added with vitamins is also given in ad libitum and replaced every day. The balance is carried out at the beginning of the treatment in order to find out the initial weight before the treated feed is then recorded. Weight of before being slaughtered (5th week) and after being slaughtered and with no internal organs is then recorded. The data is used to calculate the percentage of carcass weight by comparing the carcass weight with life weight then multiplying by 100%. Whereas after being slaughtered, abdominal fat is taken and weighed and then recorded for the calculation of the percentage of abdominal fat.

**Results and Discussion**

**Weight Gain**

Based on data analysis using ANOVA, it was shown that there was a significant effect (p <0.05) on the substitution of enzyme fermented rice bran to broiler weight gain among the treatment studies. The weight gain in the average obtained for each treatment can be seen in Table 1. Treatment P0 has the highest weight gain with 1251.14 g, P1 at 1117.43 g, P2 at 1115.14 g, P3 at 1026.14 g and the lowest P4 was 853.43 g. The energy and nutrient content which includes protein, carbohydrate, fat, crude fiber, calcium, dry weight, BETN and metabolic energy which has little difference can also affect weight gain. Phytase enzyme supplementation in feed increased the crude protein content in the fourth feed of treatment P1 (23.31); P2 (23.70); P3 (23.77); P4 (23.88) while at P0 which does not contain the phytase enzyme protein it is roughly lower P0 (23.01). The increase in crude protein in rice bran is caused by the presence of phytase enzymes which degradedphytic acid that affects the nutrient content of rice bran. Addition of phytase enzymes to reduce phytic acid, thereby increased the availability of calcium and phosphorus while increasing the nutrient content of rice bran is to increase crude protein and reduce crude fiber.
The use of phytase in broiler rations has been reported to be able to increase feed energy metabolism\textsuperscript{9,10}. The content was higher in P1 (2943.80), P2 (2920.74), P3 (2924.89), P4 (2910.06) compared to P0 (2896.17) without phytase enzymes, in this study when viewed with an average P0 has the highest weight gain with 1251.1 g after that followed by P1 treatment of 1117.4g, then P2 1115.1g, then P3 1026.1g and the lowest is P4 with 853.4 g. If it is associated with higher crude protein in P4 but the lowest weight gain, according to Nugroho et al.\textsuperscript{8}, an increase in crude protein is due to the addition of the enzyme itself. The enzyme has a major component in the form of protein. The enzyme is a protein that acts as a catalyst in biochemical reactions or as biocatalysts. Catalysts are compounds that can accelerate chemical reactions, are required in small amounts and in chemical reactions and at the end of the reaction will be recovered but the catalyst does not change the balance constant only accelerates the balance\textsuperscript{11}. It can be concluded that as a catalyst, enzymes do not participate but only accelerate the reaction process. The higher the dose of the enzyme used in the treatment, the higher the crude protein content in rice bran. Therefore, high crude protein does not function to increase weight gain but only to degrade phytic acid contained in rice bran and as a catalyst for the integration process. This is consistent with the results obtained whereby P4 had the lowest metabolic content of energy which eventually result in lower weight gain compared to treatments P1, P2, P3.

Table 1. Mean and standard deviation of broiler weight gain in the substitution of fermented enzyme rice bran

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Average Weight Gain (g)X ± Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>1251.14 ± 113.16</td>
</tr>
<tr>
<td>P1</td>
<td>1117.43 ± 108.66</td>
</tr>
<tr>
<td>P2</td>
<td>1115.14 ± 204.14</td>
</tr>
<tr>
<td>P3</td>
<td>1026.14 ± 90.44</td>
</tr>
<tr>
<td>P4</td>
<td>853.43 ± 109.08</td>
</tr>
</tbody>
</table>

Feed Conversion

Based on the data analysis using ANOVA, it was shown that there was a significant effect (p <0.05) on the substitution of enzyme fermented rice bran to the value of feed conversion between treatments. The average results and standard deviations of feed conversion values from each treatment are listed in Table 2. When viewed from the average feed conversion during the treatment, it showed that the lowest feed conversion obtained at treatment P0= 1.67, P1=1.80, P2=1.90, P3=1.99 and the highest feed conversion in treatment P4= 2.43. Feed conversion in broilers is a comparison between the amounts of feed consumed with weight gain produced at a given time. The efficiency of feed use by the body is indicated by feed conversion. The lower feed conversion is the more efficient, because the less feed needed to produce per unit of weight gain in a certain period of time\textsuperscript{13}. This is also in accordance with Rokhana et al.\textsuperscript{14} opined that high feed conversion rates are caused by the difference is greater or smaller in the ratio between feed consumed and body weight gain achieved. According to Coon\textsuperscript{15}, the main factors that influenced feed conversion are genetic, ventilation, sanitation, feed quality, type of feed, use of additives, water quality, disease and treatment and maintenance management. Feed conversion values are also influenced by body size, chicken population, energy and protein levels in feed and environmental temperature\textsuperscript{16}.

Table 2. Mean conversion of broiler feed to substitution of fermented enzyme rice bran

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Feed Conversion ± Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>1.67 ± 0.13</td>
</tr>
<tr>
<td>P1</td>
<td>1.80 ± 0.16</td>
</tr>
<tr>
<td>P2</td>
<td>1.90 ± 0.41</td>
</tr>
<tr>
<td>P3</td>
<td>1.99 ± 0.12</td>
</tr>
<tr>
<td>P4</td>
<td>2.43 ± 0.39</td>
</tr>
</tbody>
</table>

Based on the results of statistical calculations using the Duncan Multiple Comparison Test (DMRT), there was no significant difference (p> 0.05) between treatments P1, P2, P3 and P0. Nonetheless, P4 was significantly different (p <0.05). The highest average feed conversion in this study occurred at P4 with 2.43 and the lowest at P0 with 1.67. The high value of feed conversion in treatment P4 is suspected because at the time of treatment, many feeds were dropped and mixed with feces so that they were not counted. Moreover, large amount of feed consumption did not offset by
weight gain. According to Risnajati\(^7\) the value of feed conversion in chicken maintenance broiler is much related to economic value and the amount of feed that is more certainly will reduce the benefits obtained.

### Carcass Weight Percentage

The results from ANOVA showed that there was no significant effect (\(p > 0.05\)) on the substitution of enzyme fermented rice bran to the percentage of carcass weight between treatments. The mean carcass percentage in the treatment is presented in Table 3.

Broilers will show good growth with feed which has a high energy and protein content\(^8\). The level of energy metabolism in the treatment ration P0, P1, P2, P3, and P4 respectively is 2896.17 kcal / kg; 2943.80 kcal / kg; 2920.74 kcal / kg; 2924.89 kcal / kg; 2910.06 kcal / kg. In order for the broiler to achieve maximum growth, metabolic energy content in feed should not be less than 2,900 kcal / kg of feed\(^9\). The statement above shows that the metabolic energy in the treated feed still meets the normal needs of chickens. According to Faraj\(^9\) the quality requirements for broiler ration standard for crude fiber content is a maximum of 6%. Coarse fiber is needed to stimulate the digestive tract movement. Lack of crude fiber in feed causes digestive disorders, and excess amounts of crude fiber can also reduce feed digestibility\(^20\). According to Bharath et al.\(^21\), fiber can interfere with the absorption of feed and cholesterol in the small intestine, so that intestinal movements increase and cause food containing fat and cholesterol to be quickly wasted through feces. Agreeing to Faraj\(^9\), the standard quality requirements for broiler rations are roughly 19% for the starter protein and a minimum of 18% for the finisher. The proximate analysis of crude protein in the treatment rations P0, P1, P2, P3, P4 respectively was 23.01%, 23.31%, 23.71%, 23.77%, 23.88%. The proximate analysis shows that the amount of crude protein between treatments is not much different. This is due to this research using isoprotein feed formulas by means of fish meal.

### Table 3. Mean percentage of broiler carcass weight

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean percentage of carcass weight (%)</th>
<th>X± Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>70.75± 2.92</td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>70.12± 4.10</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>69.24± 1.01</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>68.44± 9.44</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>68.65± 2.72</td>
<td></td>
</tr>
</tbody>
</table>

### Percentage of Abdominal Fat

The average percentage of abdominal fat in the treatment is tabulated as in Table 4. Based on data analysis using one way ANOVA, it can be seen that the substitution of enzyme fermented rice bran in different doses of broiler feed showed no significant effect (\(p > 0.05\)) on the percentage of broiler abdominal fat. The accumulation of total body fat and its spread on the body parts of broilers is influenced by feed. The composition in feed is a factor that influences body fat content. The formation of body fat in chickens occurs because of the excess energy consumed\(^22\).

The results showed that the average percentage of abdominal fat between treatments was P0, P1, P2, P3, P4, respectively was 1.31%; 1.34%; 0.94%; 1.03%; 1.26%. Santoso\(^23\) stated that under normal circumstances, the percentage of abdominal fat broilers ranged from 1-2.5% of life weight. Based on the statement above, it can be concluded that the percentage of abdominal fat broiler in this study is normal. The data above shows that the highest percentage of abdominal fat was P1 at 1.34% and the lowest percentage of abdominal fat in P2 was 0.94%.

Treatment of P1 has the highest percentage of abdominal fat of 1.34%. The high percentage of abdominal fat is in line with the high crude fat and metabolic energy in the feed content. According to Pasi and Nahak\(^24\), the excess energy in the body of the chicken will be stored in the form of fat, while the metabolism of fat formation requires a lot of energy, and then indirectly there is waste of feed energy. While abdominal fat accumulation is included in the follow-up results, it is energy scattering and reduction in carcass
weight, because the fat is removed in the processing. Abdominal fat is one component of body fat, which is found in the abdominal cavity. The P2 treatment has the lowest abdominal fat percentage of 0.94%. The low percentage of abdominal fat is in line with the low crude fat content and metabolic energy in feed. So that the energy consumed is more used to meet the needs of basal broiler energy in normal growth and development and only a little is used for fat formation and accumulation.

Table 4. Average and standard deviation percentage of broilers’ abdominal fat

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean percentage of abdominal fat(%)</th>
<th>X± Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>1.314±0.458</td>
<td>1.314±0.458</td>
</tr>
<tr>
<td>P1</td>
<td>1.345±0.226</td>
<td>1.345±0.226</td>
</tr>
<tr>
<td>P2</td>
<td>0.943±0.359</td>
<td>0.943±0.359</td>
</tr>
<tr>
<td>P3</td>
<td>1.030±0.206</td>
<td>1.030±0.206</td>
</tr>
<tr>
<td>P4</td>
<td>1.261±0.117</td>
<td>1.261±0.117</td>
</tr>
</tbody>
</table>

Conclusion

15% enzyme fermented rice bran substitution in commercial feed produced broiler performance (weight gain, feed conversion, percentage of carcass and abdominal fat) were not significantly different from treatment without the addition of phytase (control) enzymes.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

Total Cholesterol and C-reactive Protein (CRP) Levels as Prognostic Markers for Urosepsis

Septa Surya Wahyudi1, Budiono1, Tarmono1, Soetojo1, Doddy M. Soebadi1, Sunaryo Hardjowijoto1

1Department of Urology, Faculty of Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

This study was aimed to determine and compared the total cholesterol and C-reactive protein (CRP) levels as a prognosis in urosepsis patients treated at the RSUD. Dr. Soetomo Hospital. There were 30 patients involved in this study and was assigned to the test for total cholesterol and CRP level at the day of admission, three days later, and on the last day (14th days) of sepsis or on the day of the death. The variables were tested using the Spearman’s rho test with software SPSS 20. This study found 15 patients who were in septic condition, 14 patients had severe sepsis and one patient had septic shock. There were statistically significant between total cholesterol and CRP levels in determining the outcome of urosepsis patient. The coefficient correlation of total cholesterol was better than CRP. The low total cholesterol levels and high CRP levels can be used as predictors of worsening urosepsis prognosis. Total cholesterol levels showed better performance than CRP as a prognostic marker for urosepsis.

Keywords: Cholesterol level, C-reactive Protein (CRP), Prognostic Marker, Urosepsis

Introduction

Urosepsis was a sepsis that originates from urinary tract infections with symptoms of SIRS1. Sepsis that was not adequately treated can fall under severe sepsis with MODS and even septic shock2,3. The sepsis can change body hemodynamics, hematology and metabolism body by involving immune system responses and many organ systems1,4. In severe sepsis and septic shock there can be circulatory distress syndrome at the micro and mitochondrial levels. Hemodynamic and severe circulation disorders can cause disruption of oxygen transport and cell respiration which can cause failure of many organs. Mitochondrial dysfunction plays an important role in sepsis where the rate of mitochondrial respiration dysfunction was related to the patient’s outcome. Mitochondrial failure associated with sepsis role in respiratory distress, especially in areas of hypoxia and can cause distress networks that can progress to organ dysfunction5,6.

There were several clinical and laboratory variables that can be used as markers to determine and assess the severity of sepsis and determine its prognosis. One of them was total cholesterol. Cholesterol involvement in this sepsis condition allows cholesterol to be used as a biomarker for urosepsis. Decrease in total cholesterol in sepsis occurs from the first time bacterial toxins enter the patient’s blood (host) and will further reduce the decrease in patients with severe sepsis accompanied by MODS7,8.

The reduction in total cholesterol was basically a decrease in HDL cholesterol, LDL cholesterol and VLDL cholesterol. The total cholesterol was decrease due to multi factorial factors including increased cholesterol usage in the sepsis process, decreased synthesis and changes in metabolism9,10,11. The use of cholesterol in sepsis occurs since bacterial toxins enter the patient’s body. Both endotoxins (lipopolysaccharides) from gram-negative bacteria and lipoteichoic acid (LTA) from gram-positive bacteria will bond between lipopolysaccharide (LPS) and cholesterol (lipoprotein) known as lipopolysaccharide binding protein (LBP)12,13. This cholesterol bond with lipopolysaccharide (LBP) aims to neutralize germ toxins and reduce cellular response caused by gram-negative and gram-positive
bacteria\textsuperscript{10, 14}. In addition to reduce the cellular response of the host to endotoxin, LBP also aims to present endotoxin monomers (LPS) in membrane bound CD 14 in monocytes, neutrophils and macrophages\textsuperscript{15, 16}. Thus, the invasion of germs can be prevented and overcome\textsuperscript{4, 17}. Decreased cholesterol synthesis in liver also occurs in sepsis, this was related to an increase in cytokine mediators in the form of TNF α, IL-1 and interleukin 6\textsuperscript{10}. Decreased lipoprotein (cholesterol) was seen after liver cells were exposed to TNF α, IL-1 and IL-6. This study was aimed to determine and compared the total cholesterol and C-reactive protein (CRP) levels as a prognosis in urosepsis patients treated at the RSUD. Dr. Soetomo Hospital.

**Methodology**

This study was a prospective study of the type of diagnostic test which highlight on the comparison of total cholesterol levels and C-reactive protein (CRP) in assessing urosepsis prognosis through observational analytic research designs. The study sample focused on the patients who were diagnosed with urosepsis (sepsis caused by urinary tract infection) and treated at the RSUD. Dr. Soetomo Hospital. The samples were calculated based on the formula of the sample size for correlative analytic test research. All respondents were required to sign an approval sheet following the research. On the first day, the respondents were classified based on the results of assessment for clinical severity, total cholesterol, CRP, MAP, blood leukocytes, urinalysis, urine culture and blood culture, BGA (blood gas analysis), SGOT, SGPT, BUN, and serum creatinine level. On the third day the patients were reassessed for their clinical severity, total cholesterol, and CRP. Patients were continuing follow this study until the last day of the patient’s death, recovery or a maximum of 14 days of treatment. The correlation test was performed between total cholesterol and CRP against the prognosis (outcome) of patients with the Spearman’s rho test. The correlation coefficients of each variable was determined to compare the correlation strength between CRP and blood cholesterol against the prognosis (outcome) of patients with urosepsis.

**Result and Discussion**

Table 1 showed the CRP score and total cholesterol based on outcome. The average results of the first day CRP examination in patients was $177.18 \pm 107.37$ mg/L, worsening $146.74 \pm 62.82$ mg/L, whereas in patients with improved outcome showed low average CRP score which was $88.10 \pm 74.41$ mg/L. The mean CRP values on the third and last day of patients with clinically improved decreased from $56.28 \pm 50.15$ mg/L to $31.58 \pm 37.37$ mg/L. The mean CRP of patients died on the third day was $127.10 \pm 106.28$ mg/L and on the last day was $141.88 \pm 105.61$ mg/L. The difference (Δ) of CRP between last day and first day showed positive value in the patient with outcome deteriorated which was $38.76 \pm 59.02$ mg/L, while the negative value in the patient improved and died were $-56.52 \pm 70.20$ mg/L and $-35.3 \pm 97.53$ mg/L respectively.

Examination of total cholesterol based on outcome at the end of the study showed lowest average total cholesterol examination results on the first day in patients with death outcomes that was equal to $63.25 \pm 14.15$ mg/dL and then increased follow by worsening patients which was $101.38 \pm 20.51$ mg/dL and improved patients which was $119.5 \pm 17.81$ mg/dL. Meanwhile, patients with outcome worsening and dying clearly seen total cholesterol values continued to decline. In patients worsening the total cholesterol value for the third day was $93.62 \pm 10.68$ mg/dL and the last day was $82.25 \pm 10.9$ mg/dL. In patients who died in third day, total cholesterol value was $56.0 \pm 6.98$ mg/dL and the last day was $51.0 \pm 6.16$ mg/dL. The difference (Δ) of cholesterol between the last day and first day showed positive mean value which was $35.3 \pm 21.46$ mg/dL for patients improved. While, negative mean values in patients who worsened and died were $-19.13 \pm 18.45$ mg/dL and $-12.25 \pm 11.59$ mg/dL.
Table 1. CRP levels and total cholesterol based on outcome

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Improved</th>
<th></th>
<th>Worsening</th>
<th></th>
<th>Died</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>1(^{st}) CRP (mg/L)</td>
<td>18</td>
<td>88.10</td>
<td>74.41</td>
<td>8</td>
<td>146.74</td>
<td>62.82</td>
</tr>
<tr>
<td>3(^{rd}) CRP (mg/L)</td>
<td>18</td>
<td>56.28</td>
<td>50.15</td>
<td>8</td>
<td>148.88</td>
<td>63.15</td>
</tr>
<tr>
<td>14(^{th}) CRP (mg/L)</td>
<td>18</td>
<td>31.58</td>
<td>37.37</td>
<td>8</td>
<td>185.50</td>
<td>88.71</td>
</tr>
<tr>
<td>Δ(14(^{th}) CRP - 1(^{st}) CRP) (mg/L)</td>
<td>18</td>
<td>-56.52</td>
<td>70.20</td>
<td>8</td>
<td>38.76</td>
<td>59.02</td>
</tr>
<tr>
<td>1(^{st}) Chol (mg/dL)</td>
<td>18</td>
<td>119.50</td>
<td>17.81</td>
<td>8</td>
<td>101.38</td>
<td>20.51</td>
</tr>
<tr>
<td>3(^{rd}) Chol (mg/dL)</td>
<td>18</td>
<td>128.61</td>
<td>23.61</td>
<td>8</td>
<td>93.62</td>
<td>10.68</td>
</tr>
<tr>
<td>14(^{th}) Chol (mg/dL)</td>
<td>18</td>
<td>154.83</td>
<td>25.71</td>
<td>8</td>
<td>82.25</td>
<td>10.9</td>
</tr>
<tr>
<td>Δ(14(^{th}) Chol -1(^{st}) Chol) (mg/dL)</td>
<td>18</td>
<td>35.3</td>
<td>21.46</td>
<td>8</td>
<td>-19.13</td>
<td>18.45</td>
</tr>
</tbody>
</table>

The correlation test was performed using Spearman’s rho method in order to determine the significance and strength of correlation (correlation coefficient). Correlation test was performed between first day CRP, third day CRP, last day CRP, delta (Δ) CRP (14th CRP – 1st CRP), total cholesterol of first day, third day, last day, and delta (Δ) total cholesterol (Δ 14th Chol -1st Chol)) against the outcome of patients with urosepsis. CRP and total cholesterol statistical tests were conducted in all study samples. All study samples were observed and assessed on the outcome or the condition of the patient until the last day the patient was declared cured or died.

Table 2. Results of the Correlation Test of CRP levels with the outcome using the Spearman’s rho formula (n = all samples)

<table>
<thead>
<tr>
<th>1(^{st}) day CRP</th>
<th>3(^{rd}) days CRP</th>
<th>14(^{th}) days CRP</th>
<th>Δ CRP</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation</td>
<td>1.000</td>
<td>0.795**</td>
<td>0.694**</td>
<td>-0.171</td>
</tr>
<tr>
<td>coefficient</td>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.366</td>
</tr>
<tr>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3(^{rd}) days CRP</td>
<td>Correlation</td>
<td>0.795**</td>
<td>1.000</td>
<td>0.849**</td>
</tr>
<tr>
<td>coefficient</td>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.283</td>
</tr>
<tr>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>14(^{th}) days CRP</td>
<td>Correlation</td>
<td>0.694**</td>
<td>0.849**</td>
<td>1.000</td>
</tr>
<tr>
<td>coefficient</td>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td>.</td>
<td>0.014</td>
</tr>
<tr>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Δ CRP</td>
<td>Correlation</td>
<td>-0.171</td>
<td>0.202</td>
<td>0.443*</td>
</tr>
<tr>
<td>coefficient</td>
<td>Sig. (2-tailed)</td>
<td>0.366</td>
<td>0.283</td>
<td>.014</td>
</tr>
<tr>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

* Correlation was significant at the 0.05 level (2-tailed)

** Correlation was significant at the 0.01 level (2-tailed)
Based on Table 3, the value of the correlation test of CRP levels on outcome in patients with urosepsis using the Spearman’s rho formula was shown in Table 3. Based on statistical tests it was found that CRP levels on the first, third, fourteen days, and delta CRP (day 14 minus the first day) in patients with urosepsis showed a significant correlation (p <0.05) to the outcome with a significance value of 0.011, 0.002, 0,000 and 0.047 respectively and the correlation coefficients (r) were 0.459, 0,543, 0.686, and 0.365 respectively.

Table 3. Results of Correlation Test of Total Cholesterol Level with outcome using Spearman’s rho formula (n = all samples)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1st day Chol</th>
<th>3rd days Chol</th>
<th>14th days Chol</th>
<th>Δ Chol</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st day Chol</td>
<td>Correlation coefficient</td>
<td>1.000</td>
<td>0.786**</td>
<td>0.769**</td>
<td>0.359</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.</td>
<td>0.000</td>
<td>0.000</td>
<td>0.051</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3rd days Chol</td>
<td>Correlation coefficient</td>
<td>0.786**</td>
<td>1.000</td>
<td>0.928**</td>
<td>0.716**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td>.</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>14th days Chol</td>
<td>Correlation coefficient</td>
<td>0.769**</td>
<td>0.928**</td>
<td>1.000</td>
<td>.826**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
<td>0.000</td>
<td>.</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Δ Chol</td>
<td>Correlation coefficient</td>
<td>0.359</td>
<td>0.716**</td>
<td>0.826**</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>0.051</td>
<td>0.000</td>
<td>0.000</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

* Correlation was significant at the 0.05 level (2-tailed)

** Correlation was significant at the 0.01 level (2-tailed)

Table 4 illustrated the strength of the correlation which assessed through the magnitude of the correlation coefficient (r). The correlation was stronger if the r value approaches 1 or -1. From the results of statistical tests obtained the value of the correlation coefficient (r) of CRP versus cholesterol on the first day was (0.459 VS -0.633), the third day was (0.543 VS -0.755), the last day was (0.686 VS – 0.874) and Δ CRP compared to cholesterol was (0.365 vs -0.754).

Table 4. Strength of correlation of CRP compared to total cholesterol against outcome

<table>
<thead>
<tr>
<th>Variable</th>
<th>Significant (p)</th>
<th>Correlation coefficient (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CRP</td>
<td>Chol</td>
</tr>
<tr>
<td>1st day</td>
<td>0.011</td>
<td>0.000</td>
</tr>
<tr>
<td>3rd day</td>
<td>0.002</td>
<td>0.000</td>
</tr>
<tr>
<td>14th day</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Delta</td>
<td>0.047</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Discussion

Increased CRP levels require a minimum of 12-18 hours and CRP increased slowly during sepsis and reaches peak levels in 36-50 hours. The concentration will drop rapidly with a half-life of 19 hours if the stimulus was removed. This causes CRP to be independent and only affected by therapy and actions to eliminate the inflammatory process. In this study, 4 patients died with varying initial CRP levels of 53.0 mg/L, 156.0 mg/L, 186 mg/L and 313.7 mg/L. The high level of CRP can be a description of the number of organ systems that have failed their function.

In this study, the first day CRP levels in patients with improved outcomes had the lowest average compared to the first day CRP levels in patients with worsening and dying outcomes, which was 88.10 ± 74.41 mg/L compared to 146.74 ± 62.82 mg/L and 177.18 ± 107.37 mg/L. On the third and final day examination, a very clear pattern was seen that in patients with improved outcomes there was a lower CRP level of 56.28 ± 50.15 mg/L and 31.58 ± 37.37 mg/L. Whereas the worsening of patients continued to increase, 148.88 ± 63.15 mg/L on the third day and 185.50 ± 88.71 mg/L on the last day. In patients with death outcomes, the mean on third day CRP level was 127.10 ± 106.28 mg/L and on the last day it increased to 141.88 ± 105.61 mg/L. The results of the correlation test of CRP levels with the outcome obtained significant values (p <0.05) on the examination for the first, third, and last days were 0.459, 0.543, and 0.686 respectively. These results reflect that low CRP levels were associated with a good prognosis, whereas high CRP levels were associated with a poor prognosis even to death both on the first day, third day and last day examination.

This study was determined that total cholesterol and CRP concentration can be used as predictors of outcome and prognosis of urosepsis. Serial total cholesterol and CRP measurement (periodically) will be more helpful in identifying the patient’s condition so that it can provide additional information to increase the aggressiveness of the action to be given. From the results of data analysis in this study it can also be determined that the total cholesterol level compared to CRP showed a higher correlation with the outcome of patients with urosepsis. So that the measurement of total cholesterol levels in patients with urosepsis was better in predicting outcome or prognosis when compared with CRP levels.

Conclusion

In conclusions, total cholesterol levels can be used as a marker of prognosis (improved / worsened / died) in urosepsis patients both on the first, third, and last day examination with a significant correlation (p <0.05). The lower the total cholesterol level the worse the prognosis of the patient and vice versa. CRP levels can be used as a marker of prognosis (improved / worsened / died) in urosepsis patients both on the first, third, and last day examination with a significant correlation (p <0.05). The higher the CRP level the worse the prognosis of the patient and vice versa. Plasma total cholesterol levels showed a greater correlation coefficient than CRP levels on patient outcomes with urosepsis both on the first day examination (-0.633 vs. 0.459), third (-0.755 vs 0.543), and the last day (-0.874 vs 0.686). So that total plasma cholesterol levels can be used as a better prognosis indicator than CRP levels.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


7. C. Chiarla et al. “Severe hypocholesterolemia


Application of a Photogrammetric Kinematic Model for Prediction of Lung Volumes in Adults: A Pilot Study

D. Malarvizhi¹, Aruna Ramanan Sekar²

¹Dean Incharge, ²Final Year Student, SRM College of Physiotherapy, SRM Institute of Science and Technology, Kattankulathur

Abstract

Background: The use of equipment such as spirometers in respirometry and analysis of respiratory muscle strength are some of the methods of evaluation for lung volume. Advancement in technologies aims to measure and evaluate the respiratory performance which is Vital for health professionals. The aim of the study find out the correlation of lung volumes between spirometry and the values obtained in AutoCAD® software.

Methodology: The study was Non-experimental design, observational type. Total 15 subjects, age group of 18-24 years with no history of respiratory illness were included and subjects using bronchodilator were excluded at SRM Medical College Hospital and Research Centre, SRM Institute of science and technology, Kattankulathur. There was five-point mapping for anatomical modeling and photogrammetry with each evaluated for Spirometric values. A video was taken during the procedure and filmed then the film was extracted into images for the proof of maximum inspiration and expiration. With the use of AutoCAD® software the defined respiratory volumes were obtained.

Results: Statistical analysis shows that correlation between the upper abdomen inspiration the mean and S.D value 116.93±11.8, and the FVC mean and S.D value 2.77±75, FEV₁ is 3.96±64 respectively. The correlation is significant at p< 0.05 (2-tailed).

Conclusion: The study concluded, the FVC and FEV₁ lung volumes may predict which are co-related with the abdominal inspiration of the 3-dimensionalexploration.

Keywords: Photogrammetry, Spirometry, adults

Introduction

Lung volumes are subdivided into static and dynamic lung volumes. Static lung volumes are measured by methods which are based on the completeness of respiratory maneuvers so that the velocity of the maneuvers should be adjusted accordingly. The measurements taken during fast breathing movements are described as dynamic lung volumes and as forced inspiratory and expiratory flows¹.

Factors which determine the size of the normal lung include stature, age, sex, body mass, posture, habitus, ethnic group, reflex factors and daily activity pattern. The level of maximal inspiration is influenced by the force developed by the inspiratory muscles, the Vital capacity. Hence the vital capacity alone is of little use discriminating against restrictive, obstructive and mixed ventilatory defects. In some cases of cystic fibrosis, which primarily affects the airways, temporary decreases in TLC have been described, possibly due to partial atelectasis².

The respiratory performance is the result of many sets of organs, where the respiratory muscles and bony structures especially the thoracic cage that works simultaneously to generate the phenomenon called ventilation which is vital for humans³. The thoracoabdominal surface respiratory movement is found to be effective to evaluate the performance of the pulmonary function. The equipment used such as spirometers, peak expiratory flow meter and assessing the respiratory pattern of the individual are some of themethods of evaluation. Advancement in technologies aims to measure and evaluate the respiratory...
performance which is Vital for health professionals. Using the advancement in the technologies this study aims to correlates the spirometry values with the lung volumes measure using the AutoCAD software. The need for the study is to find the most cost-effective, reproducible and reliable method. The objective of this study was to find the lung volume using photogrammetric model. Photogrammetry, it is processed dating from the 9th century which gives the quantitative information about the system evaluated by inserting metric dimensions into images which is available in AutoCAD software by the extrusion tool.

**Methodology**

The study was Non-experimental design, the observational typewas carried out with 15 sample, which the 15 samples are healthy adult males who had no history of respiratory illness aged between 18-24yrs, informed consent form and Institutional Ethical committee approval also obtained before starting the study. Samples were undergone the photogrammetric analysis, anthropometric analysis, and spirometric analysis in long sitting position and the respective values were obtained. The anthropometric analysis includes height (cm) weight (kg) and the thoracic length, the thoracic length is obtained by the anthropometric caliper which is positioned in line with the xiphoid process, then the samples were asked to take a deep inspiration with their arms stood up and the thoracic length was measured.

A camera was used to record the moment of maximum inspiration and expiration during the spirometric analysis in the long sitting position which is placed 2m away from the participant and the tripod is used to position the camera accordingly. The reflective markers are used to indicate the anatomical points in the photogrammetric analysis, the reflective markers are placed on the following anatomical points of the samples, the projections of the umbilicus (COD), the inferior angle of the 10th rib (ACd), the xiphoid Process (AXd) and the right anterior superior iliac spine (EId).

The windows movie maker was used to extract the frames from the video for the moment of maximum inspiration and expiration. Then these images are transferred into AutoCAD for three-dimensional model the thoracic and abdominal values were obtained. The 3-dimensional model was obtained from the AutoCAD 2012 by inserting the thoracic length into the 2D model through the extrusion tool which is available in the software.

**Results**

The data analysis of co-relation between upper abdomen inspiration and spirometric values were analyzed by IBM SPSS version 20

**Table 1. Co-relation between Upper abdomen inspiration and spirometric values of FVC and FEV<sub>1</sub>**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean ± SD</th>
<th>r-value</th>
<th>p.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper abdomen (Inspiration) FVC</td>
<td>116.93±11.8</td>
<td>2.77±.75</td>
<td>0.549</td>
</tr>
<tr>
<td>Upper abdomen (Inspiration) FEV&lt;sub&gt;1&lt;/sub&gt;</td>
<td>116.93±11.8</td>
<td>3.96±.64</td>
<td>0.556</td>
</tr>
</tbody>
</table>

Table-1 shows the mean value, r-value and p-values of upper abdomen inspiration and FVC, FEV<sub>1</sub>
Results

According to the Table-1, Graph 1 and 2, there is a correlation between the upper abdomen inspiration, the mean and standard error value 116.93±11.8, and the FVC mean and standard error value 2.77±75, FEV\textsubscript{1} is 3.96±64 respectively. The correlation is significant at the 0.05 (2-tailed)

Discussion

The objective of the study is to find the lung volume using the bio-photogrammetric model by Autocad software for the three-dimensional exploration in long sitting position and to find the cost-effective method in predicting the lung volume using the advancement in the technology.

Spirometry assesses the integrated mechanical function of the lung, chest wall, and respiratory muscles by measuring the total volume of air exhaled from a full lung (total lung capacity [TLC]) to maximal expiration (residual volume [RV]). The spirometry is used to diagnose the chronic lung disease such as chronic obstructive lung disease and emphysema.

The Autocad uses the movement of the chest wall and the breathing pattern of the individuals to measure the volume of the lung because the movement of chest wall and pattern of the breathing also influences the volume of the lung\textsuperscript{6,7}.

The pulmonary function test is usually done to find the pulmonary impairment this can be done with various instruments such as spirometry, peak expiratory flow meter. Spirometry – measures the FVC, FEV\textsubscript{1}, FEF values, forced inspiratory flow rates (FIFs). Using autocad method the values of FVC, FEV\textsubscript{1}, FEF values were found but the values of FVC, FEV\textsubscript{1}, correlated with spirometry hence the values of FVC, FEV\textsubscript{1} can also found using AutoCAD method.

Ripka, W. L., et al concluded that 2D photogrammetry analysis can identify the breathing pattern of the children. The advantages of two-dimensional analysis are the possibility for locally testing due to ease of resources transportation, low cost of involved material and the lack\textsuperscript{3}.

Wagner L Ripka, et al concluded that the photogrammetric model using the 3-dimensional exploration can be used to find the thoracoabdominal movements in the adolescent’s age group between 14-17 years\textsuperscript{10}.

Statistical analysis of the study showed that there is a relationship between the upper abdomen inspiration, FVC, and FEV\textsubscript{1}.

Conclusion

The study concluded that FVC and FEV\textsubscript{1} lung volumes are predicted which is co-related with the abdominal inspiration of the 3-dimensional exploration and lung volumes can also be predicted by photogrammetric kinematic model adults.

The limitations of the study the use of the AutoCAD software should be in precise and the positions of the subject should be changed and can be evaluated. The study does not include the adult female due to anatomical points mapping over the body, for the successful prediction of lung volumes using a photogrammetric model more number trial and error should be done in the study.

The components in the study can be added in a single application by coding the components for making the apps for measuring the breathing pattern and thoracoabdominal movements.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Pysiotherapy in Wilson’s Disease –A Case Report

Suresh.J 1, Janani 2

1Assistant Professor, 2BPT Student, SRM College of Physiotherapy, SRM Institute of Science and Technology, Kattankulathur, India

Abstract

Wilson’s disease, it is also known as Hepatolenticular degeneration which is an autosomal recessive disorder which results in abnormal metabolism of copper. It leads to accumulation of copper in the organs such as liver, central nervous system, kidney, cornea and other tissues, which results in impaired function, these are caused by mutation of the ATP7B gene. The symptoms usually develops in the late adolescence but the deposition of copper begins immediately after birth. Liver disease or neurological symptoms are the two common presentation which typically manifests Wilson’s disease. Liver related pathologies will tend to experience in symptomatic adolescents, while neurological signs and symptoms will occur in older adults. This is a rare condition affecting only one person in 30,000 in most. This disease has been found to be 56% of gene frequency with a carrier frequency of 1 in every 90 people. Recent studies has shown an increase incidence of this gene mutation which has been found in isolated populations.

Keywords: Wilson’s Disease, physiotherapy treatment, dysarthria.

CASE PRESENTATION

Name: Mrs B.RAMYA

Age: 13

Gender: Female

A 13 year old female patient was diagnosed with neurological Wilson’s disease. There is no family history regarding same disease. In 2016 at the age of 11 the patient is admitted for presenting a clinical picture of bradykinesia, rigidity and gait disturbance for which required assistance. A brain study was conducted which showed hyper intense lesion in basal ganglia together with the presence of kayser fleischer ring, in 2016 the patient was diagnosed with Wilson’s disease and the patient started medication.

The patient has generalised dystonia with her lower limbs of hindered gait which caused recurrent fall according to the patient’s report. The patient present with hand–eye coordination, emotional and behavioural changes and neurological involvement which present Athetoid movements and unsteady gait.

The central nervous system symptoms includes tremors in hand, facial and muscular rigidity and dysarthria.

The patient was under medication with strict control of her neurologist, the medication remained the same before start or during the physiotherapy treatment.

ASSESSMENT TOOLS

TUG

10 Meter Walk Test

Functional Gait Assessment Scale

Activity Balance Confidence Scale

PHYSIOTHERAPY MANAGEMENT

The treatment goals was to reduce the risk of falls and the difficultly to overcome architectural barriers.

The treatment was based on static and balance exercises and on functional capacity training.

The treatment frequency was 6 days a weeks for 6months.

Exercise aimed at improving static balance:
The training began with sit to stand exercises, on a stable surface, with feet together on the floor with hand support of the therapist. In this position the patient was trained to hold for maximum 20 sec to improve static balance. These exercises were performed in 5 series of 5 minute duration with 3 minutes breaks.

**EXERCISE AIMED AT IMPROVING DYNAMIC BALANCE**

This training was done on swiss ball with back extension and flexion with legs supported, it is carried out for 25 repetition. so the goal was to stabilise the spine. Once this has achieved the gait training was performed with walker initially. In later stage of the treatment the patient was trained to walk without walker with the help of back support and the main aim was to stabilise the lower limbs. Simultaneously stretching was done for both upper limbs and lower limbs, pelvic bridging is also done for 4 series of 3 minute duration with 4 breaks in between. The dosage was delivered according to the patient’s tolerance with breaks of 5 minutes this type of training lasted approximately 1 hour per session.

**EXERCISE AIMED AT IMPROVING FUNCTIONAL CAPACITY TRAINING**

This training stage was aimed at patient daily activities in which she found some difficulties, for instance walking up and down stairs or ramps, picking up objects from the floor, writing in notebook to improve handwriting skill and to distract psychologically. The patient was dosed according to his tolerance, with rest periods in between 5 to 8 minutes with a total of 30 minutes. Speech training is also given to reduce the risk of dysarthria, which is followed by stretching of facial and oral muscles.

The treatment presented no problems or associated injuries in its development. On the other hand the patient reported being satisfied with it.

In the final evaluation the patient showed a genuine self reported improvement in balance confidence.

**Table 1. Test Results and Scales Evaluated Pre and Post Intervention**

<table>
<thead>
<tr>
<th></th>
<th>INITIAL EVALUATION</th>
<th>FINAL EVALUATION</th>
<th>DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUG</td>
<td>18.4</td>
<td>15.1</td>
<td>3.3</td>
</tr>
<tr>
<td>10MWT</td>
<td>1.2ms</td>
<td>1.3m/s</td>
<td>0.1</td>
</tr>
<tr>
<td>FGA</td>
<td>13/30 points</td>
<td>18/30 points</td>
<td>5 points</td>
</tr>
<tr>
<td>ABC scale</td>
<td>62%</td>
<td>70%</td>
<td>8%</td>
</tr>
</tbody>
</table>

TUG: Time up and go; 10MWT: 10 Meter walk test; FGA: Functional gait assessment; ABC Scale: Activity balance confidence scale

**Discussion**

The kinesic approach to this pathology is still based on empirical principal due to limited evidence available, as works consulted do not provide information about physiotherapy treatment.

After the treatment the patient achieved stability of spine which showed the patient development from muscular rigidity.

Athetoid movements and unsteady gait were controlled at the maximum possibilities.

Tremors in hands and facial rigidity has been reduced.

Hand-eye coordination, emotional and behavioural changes has been modified.

The risk of fall has been reduced.

**Conclusion**

This case report is to our knowledge, the first to describe an approach to physiotherapy management on movement disorders present in Wilson’s disease more specifically on gait and balance disorders. We consider necessary to carry out further research on different interventions that serve to justify and improve the physiotherapy approach in movement disorders.
Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Effect of Living Arrangements on Health Status of the Elderly in Malaysia

Norehan Abdullah¹, Shamzaeffa Samsudin¹

¹School of Economics, Finance and Banking, Universiti Utara Malaysia, 06010, Kedah, Malaysia

Abstract

Malaysia needs to prepare now to address the ageing society problem, which is expected to account for 15% of the population by 2035. The increasing number of the elderly in the total population means there is an increasing incidence of ill health and chronic diseases. The World Health Organization in 1977 has described elderly people living alone as an ‘at risk’ group. Living alone in later life is often seen as an undesirable state and as a potential health risk. It is therefore crucial to understand the relationship between living arrangement and health status for the old age. Using a sample of 1,414 elderly from the northern Peninsular of Malaysia, this paper aims to examine the effect of living arrangement of Malaysian elderly’s on the health status. The study found that living alone nor living with spouse, children or others is not significant in affecting the health status of elderly, but the physical aspect of living in own-home does matter to the probability of perceiving good health.

Keywords: Elderly, living alone, own-home, self-perceived health, and long-standing illness

Introduction

Like any other country, Malaysia is heading towards an aging society. The Malaysian Statistic Department (2016) estimates that Malaysia is expected to reach ageing population status by year 2035, at which point 15% of the total population will be 60 years and older and it is roughly 16 years from now¹. Many are concerns over the socioeconomic effects of population ageing, namely its effects on economic growth, availability of public funds, and financing of the healthcare system². Furthermore, the increasing numbers of older adults derive a challenge to maintain quality of life and well-being of Malaysian elderly.

As Malaysia’s population is ageing and decreasing birthrates, we expect to exert extra pressure on healthcare resources³. Mounting number of old-age population are actually posturing enormous health care threats and social challenges. There are many factors that may determine health status of the elderly, and one of the factors is living arrangement. Although the Malaysian government has played a substantial role in providing elderly’s living arrangement and welfare, there will be a changing necessity that may require public provision, thus understanding the living arrangements of older adults is imperative.

Due to the recent trend of nuclear family structure, decline in extended family, and increasing life expectancy, there is a high tendency for Malaysian older adults to live alone at their own home. Many epidemiology studies have shown strong relationships between insufficient family supports with deprived health among elderly⁴. In addition, the World Organization⁵ has described elderly people living alone as an ‘at risk’ group. Living alone at the old age is undesirable state, as potential health risk and needs specific care.

In examining the effect of living arrangement on health status in India, a study by Agrawal found that elderly who are living alone have poorer health status, in term of self-reported prevalence of acute and chronic ailments, than elderly who are living with their family⁶. In this aspect, by living alone, feeling of loneliness and social isolation will worsen health problems and it may be unnoticed. In the United States, using data sampled from National Health Interview Survey 2009-2014,
Weissman and Russel found that elderly living with others have the poorest health; and less likely to report excellent or very good health, compared with older adults living with spouse or life-partner.

In a developing country like Bangladesh, the impact of living arrangements on self-reported general health are different according to gender. For older men, controlling for age, education and household assets, a co-resident spouse does not have any impact on self-reported general health. In contrast, for older women, living with spouse has a significant positive impact on self-reported general health. The presence of co-resident son have no impact on self-reported health for older women.

In China, older people are trended to choose formal home care. There was an interaction and joint effect between degree of disability and living arrangements. Thus, it was suggested that the policymakers to be more attentive to care for those living alone and focus on construction of facilities in rural areas.

In the context of Malaysia, a substantial number of the elderly are associated with financial problem and poor health conditions. This highlights the need of elderly to rely on their spouse or children as founded in one study based in Pahang state. Living with children is the commonest type of living arrangement for older adult in Peninsular Malaysia. Compared to living alone, living with spouse, and living with both spouse and children is associated with better life satisfaction. Although living at own home is preferred, but older Malay women are more likely to live with children, compared to older men as a second choice of living arrangement. Furthermore, Malaysian elderly who are low educated, female, Malay, not in good health, need long term medical treatment, no medical insurance and low income, are more likely to live with their adult children as compared to other living arrangements.

A study among pre-elderly Malay, aged 40 to 59 from three economic corridors of Peninsular Malaysia found that majority (83%) of the respondents prefer to live in their own homes in their old age. Among factors influence the probability to choose own home includes age, household size, gender, marital status and level of education. Income on the other hand has limited influenced over the choice.

Generally, there has been a trend change in the living arrangement preferences at old age among the current generation, but the effect of such arrangements on health status requires continuous investigation as the effect may differ due to different settings and social environment of the population under study. Furthermore, current evidence on the effect of living arrangement among the elderly on their health status is important in designing effective welfare policies for this vulnerable group. Therefore, in this study we aim to investigate the effect of living arrangements on health status among the elderly residing in northern states of Peninsular Malaysia. We use two indicators to proxy health status – the self-perceived health and whether or not the respondent is living with at least a long-standing illness. The self-perceived health measures one’s own perception while long-standing illness refers to physical health, which is the objective status of one’s health We use two distinct indicators, as people may sometimes feel good and healthy despite of having long-standing illness.

**Data and Method**

**Data**

A cross-sectional survey was used to obtain the required information from the respondents aged 60 and above in the northern peninsular Malaysia (Perlis, Kedah, Penang and Perak). The interviews were conducted from 1 September 2012 to 14 February 2013. A combined cluster, stratified and snowball-sampling design is used. For each state, we divided the targeted population into three clusters: rural, urban (city) and urban (big city) which then we randomly selected one big city, city and rural from each state. In obtaining appropriate ethnic representation in the sample, we stratified housing estates into Malays and Non-Malays majorities. A total of twenty four housing estates were chosen from the three clusters and respondents were obtained by snowball sampling. Once the elderly voluntarily agreed to participate in the survey, he or she was asked to recommend other elderly in the housing estate. We pre-determine the targeted sample size based on the number of population in each state and managed to interview 1,420 respondents.

**Empirical specification**

This article aims to examine the effect of living arrangements on health status of elderly. We measured health status using two indicators: (1) self-perceived health (SPH) and (2) the existence long-standing illness.
Thus, two separate probit models were used in determining the effect of living arrangement on SPH and LSI. Respondents were asked on how they perceived their health, either good or otherwise (SPH) and whether they have a long-standing illness (LSI).

Assume that for each elderly, there is a latent variable that represents an unobserved health status. This unobserved health status is associated with variables such as living arrangements, socio-demographic characteristics of the elderly and other relevant variables, denoted by \( x_i \).

Let, for each individual \( i \), \( y^* \) represent the latent variable and assume that \( y^* \) is a linear function of \( x_i \), then,

\[
y^*_i = \sum_{i=1}^{n} \beta x_i + u_i
\]

where
\( y^* = \) unobserved health status (SPH) or (LSI)
\( x = \) independent variables including living arrangement
\( u = \) error term

Let \( y \) be the random variable that represents the observed outcomes such that value of \( y \) is observed as:
y = 1 if the elderly perceived as good health or have long-standing illness
y = 0 if otherwise

Assume that the error term in the latent equation (1) follows a normal distribution, we have the probit model. The probability that the elderly have observed outcome of good health or long-standing illness (\( y = 1 \)) or otherwise (\( y = 0 \)) are as below:

\[
\text{Prob}(y = 1) = \text{Prob}(y^* > 1) = \text{Prob}(x \beta + u > 0) = \text{Prob}(u < x \beta) = \Phi(x \beta)
\]
\[
\text{Prob}(y = 0) = 1 - \text{Prob}(y = 1) = 1 - \Phi(x \beta)
\]

The \( \Phi \) is the cumulative standard normal distribution function. The maximum likelihood parameter estimates (MLE) are obtained by maximizing the following log likelihood function with respect to \( \beta \):

\[
LF(\beta) = \sum_{i=1}^{n} y_i \ln(\Phi(x \beta)) + (1 - y_i) \ln(1 - \Phi(x \beta))
\]

The model is estimated with the robust variance estimates (Huber/White/sandwich estimator of variance).

**Findings**

List of variables with the summary statistics of independent variables used for empirical analysis is presented in Table 1. From Table 1, it shows that 61.1 percent of respondents are Malay), the mean age is at 69 years old, and majority of the respondents have been retired and married. Their highest education attainment is post degree education.

**Table 1. Summary Statistics of Dependent Variable and Independent Variables N=1,414**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent variable</td>
<td>goodhealth 1 if self-perceived</td>
<td>0.544</td>
<td>0.498</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>health is good</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>long_ill</td>
<td>1 if had long standing illness</td>
<td>0.664</td>
<td>0.472</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Dependent variables</td>
<td>Age (years)</td>
<td>69.306</td>
<td>7.187</td>
<td>60</td>
<td>98</td>
</tr>
<tr>
<td>Male</td>
<td>Gender 1 – Male; 0 – Female</td>
<td>0.537</td>
<td>0.499</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
About half of the respondents perceived their health as good while 66 percent reported of having long standing health problems. About 31 percent of respondents declared that they currently living at their own home. Living arrangement is constructed as in Table 2, which show that around eight per cent of the elderly is living alone. On the other hand, there are around 35 per cent of the elderly living with spouse only; around thirty-two percent with spouse and other family members; around 25 per cent with other family members only. It appears that to some extent, majority of respondents do not live alone.

The probit model was estimated for the self-perceived health, *goodhealth*, and the existence of long standing illness, *long_ill*. The estimated probit model fits the data significantly with p-value of almost zero (prob>chi2 =0.0000) and pseudo R square of 0.0781 and 0.0422, respectively. The estimation from the probit models is shown in Table 3.

### Table 1. Summary Statistics of Dependent Variable and Independent Variables N=1,414

<table>
<thead>
<tr>
<th>Variables</th>
<th>Highest Education level (1 if has no formal school to 10 if post degree)</th>
<th>2.730</th>
<th>1.869</th>
<th>1</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>1 if married, 0 otherwise</td>
<td>0.724</td>
<td>0.447081</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Malay</td>
<td>1 if Malay, 0 otherwise</td>
<td>0.612</td>
<td>0.487</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Retired</td>
<td>1 if retired, 0 otherwise</td>
<td>0.705</td>
<td>0.456</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Exercise</td>
<td>Time allocation for exercising in a week (1 if does not exercise at all to 5 if exercises more than 3 hours)</td>
<td>2.482</td>
<td>1.603</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Smoker</td>
<td>1 if a smoker, 0 otherwise</td>
<td>0.194</td>
<td>0.396</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Income</td>
<td>Log total of individual income from all sources</td>
<td>5.484</td>
<td>2.618</td>
<td>0</td>
<td>9.903</td>
</tr>
<tr>
<td>Chat</td>
<td>1 if had informal interaction with the society (e.g. chatting at coffee shop or at home), 0 otherwise</td>
<td>0.762</td>
<td>0.426</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Alone</td>
<td>1 if live alone, 0 otherwise</td>
<td>0.086</td>
<td>0.280</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>own-home</td>
<td>1 if live in own-home, 0 otherwise</td>
<td>0.885</td>
<td>0.319</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

### Table 2. Living arrangement of the elderly

<table>
<thead>
<tr>
<th>Types</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Alone</td>
<td>121</td>
<td>8.56</td>
</tr>
<tr>
<td>Living with spouse only</td>
<td>493</td>
<td>34.86</td>
</tr>
<tr>
<td>Living with spouse and others</td>
<td>456</td>
<td>32.26</td>
</tr>
<tr>
<td>Living with others only</td>
<td>344</td>
<td>24.32</td>
</tr>
<tr>
<td>Total</td>
<td>1,414</td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 3. The Estimated Probit Model on Health Status

<table>
<thead>
<tr>
<th>Variables</th>
<th>Goodhealth coefficient</th>
<th>p-value</th>
<th>long_ill Coefficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.0097</td>
<td>0.061</td>
<td>0.0039</td>
<td>0.460</td>
</tr>
<tr>
<td>Male</td>
<td>0.0733</td>
<td>0.386</td>
<td>0.0313</td>
<td>0.718</td>
</tr>
<tr>
<td>Edu</td>
<td>0.0529**</td>
<td>0.012</td>
<td>-0.0545***</td>
<td>0.009</td>
</tr>
<tr>
<td>Married</td>
<td>-0.1727</td>
<td>0.059</td>
<td>0.1352</td>
<td>0.148</td>
</tr>
</tbody>
</table>
The variables that represent living arrangements in the analysis are alone and own-home. The analysis shows that variable alone has no influence on the health status of elderly, neither perceived or physical health. In short, living alone nor living with any member of family is not significant in determining the health status of elderly in northern states of Malaysia. This finding is in contradiction of previous studies by Agrawal and Weissman and Russell, which concluded older adults living alone, will have poor health status as compared to living with co-resident. Nevertheless, living at their own-home has a positive impact on good self-perceived health, but not actual health status, measured by long_ill. The elderly are more likely to perceive themselves as in good health if they stay in their own home. This may be because the attachment to own home gives more living satisfaction, empowerment and happiness.

In terms of demographic variables, the influence of education and economic activities on perceived and physical health are comparable. The level of education has a positive impact on the probability of perceived good health and negatively affect the probability of having long-standing illness. In other words, the more educated these elderly’s are, the higher the probability of perceiving good health and the lower probability of having long-illness.

From Table 3, it demonstrates that retired, exercise and chat affects significantly the probability of having good health. As the elderly actively involved in exercise activities and spending more time to chatting with friends and neighbors, they have higher probability to perceive themselves as in good health. Furthermore, this type of social support enhanced the relationship between living arrangements and life satisfaction.

The results of the probit model for long-standing illness, it shows that retired, exercise, smoker and income are significant in affecting the health status of elderly. Being a retired elderly and has a certain amount of income increase the probability of having long-standing illness. However, living a good live through doing exercises and not smoking, has lower the probability of having longstanding illness. Other variables such age, gender, ethnicity and living with co-residents are not statistically significant in determining health status in this analysis.

**Conclusion**

Health status can be distinct in terms of perceived and physical. How you assess your health is more of a perception of conceptual but having a long-standing illness is more of an objective measures. This study has provided some evidence on the effect of living arrangement and other factors on health status, measured
by both perceived and physical health of the elderly in northern states of Malaysia. It was found that living alone is not significant in affecting their health status, be it perceived or physical. On the other hand, they are more likely to perceive of having a good health if living at the comfort of their own-home. While the effect of living in own-home is significant on perceived health, it is not on the probability of having long-standing illness. This reflects that the choice of health indicators has somewhat influence understanding on this issue. Feeling of having good health does not necessary mean that one is physically healthy and conclusion may differ based on different health indicators. Although, living alone has positively influenced the likelihood to be in good health status among the elderly in this study, social support by the society is still essential. By promoting social engagement of older persons, such as volunteerism, it may yield important benefits for them and for the productivity of society. Health care facilities should be properly designed as to ensure easy access and meet the expectation and demand of the old generation.

Acknowledgment: We would like to thank Universiti Utara Malaysia for providing financial support to this study through its PBIT research grant (S/O code 12312). Thanks are also due to the anonymous reviewers whose comments have improved this paper substantially.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Study on Heart Rate Visualisation Using Combination of Real Time Heart Rate Detection and Augmented Reality

Norazlin Mohammed1, Junaidah Binti Idrus1
1Center for Advanced Computing Technologies (C-ACT), Faculty of Information and Communication Technology, Universiti Teknikal Malaysia, Melaka (UTeM), Melaka, Malaysia

Abstract

Heartbeat is a natural process which the heart continuously beating without any control from the living thing while heart rate is the speed of the heartbeat measured by the number of contractions of the heart per minute (BPM). There are few methods that can be used to check heart rate. Traditionally, heart rate is check by placing a finger on wrist or temple area and the pulse is counted in one minute. There are few devices that can be used to check the heart rate such as a stethoscope, electrocardiogram (ECG) and chest strap. This paper presents the study on the comparison of these devices that are commonly used nowadays. As analysis being done, none of the existing devices provide visualization features that enable user to see how the heart beating process happen in a human’s body. This paper also presents the study on providing visualization of heart beating process by using Augmented Reality in delivering health information to improve the understanding on user heart condition whiles getting their real-time heart rate. Since AR is one of the new emerging technologies, it can be used to visualize the user heart beat in real time and user can interact with the application to get details of their heart condition. This project also aimed to encourage the user to do frequent heart rate checkup in order to let them monitor their health by providing interactive features of ‘Lean Touch’ where heart model can be scaled, moved, and zoomed.

Keywords: Augmented Reality; Beats per minute (BPM); Heartbeat; Interactive; Visualization;

Introduction

Heart rate is the speed of the heartbeat measured by the number of contractions of the heart per minute (BPM). Every living thing need heart beat to pump blood and supply oxygen to whole body. Traditionally, heart beat measurement usually taken at pulse point of the body. The measurement is count based on how many beats per minute. There is few point from our body that enable us to take detect heart rate such as wrist, inside of your elbow, side of neck or top of your foot. Pulse is rhythmical throbbing of the arteries as blood is propelled through them and it used to help us get a picture of our health. Very low or fast heart beat is a signal of few diseases that need further check up with doctor. The problem raised when it comes to visualization part as patient and doctor cannot see the heart pumping. As the doctor used statoscope, doctor can only hear and count the heart rate. As for patient, they just get the result from doctor observation as we as person with normal hearing, when it comes to pitch the human hearing range starts low at about 20 Hz and ability to hear it is different for each individual. This project goal is to solve the current limitation of visualization of the heart rate for the patient. Augmented reality technology will be used to develop this application in order to produce a functional heart beating model associated with the real time heart rate reading.

Literature Review

Heart rate or pulse is a vital signed used to measure basic function of human body. Heart rate is measure on how much beating in a minute. Heart rate is taken to check rhythm and strength of the heartbeat. This is due to uneven rhythm or weak pulse might be a sign of a heart problem. Heart rate usually measured by using
your index finger any pulse point on your body and count the beats for set period of time. Example of pulse area include wrist, neck, temple area, groin, behind the knee, or top of the foot. Although this traditional method of counting the beats in second and then multiply the result by two is simple, it is not accurate and it could lead to error in counting when the heart rate is high. Other sophisticated method is created like a smartwatch for pulse detection, digital pulse reader and etc. By using all this new device or technology, the accuracy of the heart rate reading is higher and the risk of error can be reduced.

The latest technology has used mobile phone as the heart rate reader. The camera flash from mobile phone will get the measurement of the heart rate and give result to the user less than 10 second. The main idea of how the heart rate is measured is by detecting the change of skin colour and brightness of the surface of skin due to blood pulsation. However, this raw signal cannot be simply taken as it may contain noise or fake peaks or data loss due to movement of the finger during the reading is taken.

In medical sector, the most crucial instrument for checking the heart beat is a stethoscope. Stethoscope is a medical instrument that is used to check the performance of the heart and the lung. If there is any murmur; a condition where the heart sound is unusual that may reflect disease or malformation of the heart, further check-up is needed by using other instrument. There are many forms of murmurs and each of them represent a variety of heart condition.

Other example in medical sector is the Electrocardiograms (ECG). Electrocardiograms (ECG) is a test that is used to identify the underlying heart condition by measuring the electrical activity of the heart. Condition that may be diagnosed an ECG test are abnormal heart rhythms whether the heart pumps too fast or too slow, abnormal conduction of cardiac impulses that may indicate metabolic disorder, presence of a prior heart attack, occurrence of abnormal blood electrolytes such as potassium, magnesium and calcium.

Other than all stated above, there also few wearable gadgets that have been invented to fulfil the needs of our modern culture. This wearable device includes wristband heart tracker, chest strap and also fitness tracker. Other than that, there is also heart rate monitor integrated with headphones which allow the user to listen to their favourite music while doing physical activity. This headphone is connected to the user smartphone via Bluetooth and the heartbeat of the user is send to the smartphone during the activity.

Augmented reality (AR) is one of the technology that allows a level of immersion for user but the immersion level is not a fully immersion like the virtual technology provide. Augmented reality objective usually is simplifying the user’s life by providing virtual information immediately in the user’s real world surrounding. Augmented reality technology have been used in many sector or applications such as surgery, inspection of hazardous environments, and engineering. Currently the augmented reality technology basically covers for indoor activity within small areas. However, with the advances of the computer, and present of wireless technology, development of wireless augmented reality for outdoor application could be made. There are six different types of augmented reality that fall under two basic categories which is marker based and markerless based augmented reality. Marker based augmented reality are one that use marker or object to initiate the augmentation. Marker Based Augmented Reality can be easily recognized and does not require a lot of processing power to read. The other types of augmented reality are markerless based AR; these types of AR allow the user to experience augmentations without marker. Markerless Based Augmented Reality also known as location-based or position-based or GPS. Wide availability of smartphones and location detection enhance the Markerless Based Augmented Reality. This technology used detection technology to recognize something or pattern before the scene is display.

As the Internet of Things (IoT) rapidly develop, this project is one of a IoT project that used Particle Photon as one of the hardware. Every Photon can easily be connected to the cloud by claiming each device in the Particle Cloud. With this Particle Cloud, developer can know the last time that the Photon active, and even to test the functionality of the photon by flashing LED on photon using flash function available in the web IDE. Other than Particle Photon, pulse sensor also used in this project in order to detect the pulse of the user hence getting the heart rate of the user. Pulse sensor is a plug-and-play heart rate sensor for Particle Photon compatibles. Pulse sensor usually used with Arduino to get the heart rate of the user.
**Existing System**

There are three existing systems that can be used to get heart rate which are stethoscope, electrocardiogram and chest strap. In medical sector, stethoscope is the most crucial device which doctor will use to check the patient’s heartbeat. Listening to the heart and lung need different listening skill to distinguish one another. Uses of stethoscope is painless and it give information on how the body function and if there is any further treatment to be done.\(^1\)

ECG is an ambulatory electrocardiogram monitors if the heart in normal state. It helps to detect abnormal heart rates or rhythms of the patient. ECG can detect if there is previous mild heart attack that did not show any symptoms or demonstrating heart disease that has not been suspected.\(^2\)

Chest strap should be worn directly under the breast and strap need to be adjust as tight enough to ensure constant contact with your skin. Although the uses of chest strap may cause uncomfortable affect, somehow the chest strap have the highest accuracy compare to other heart monitor device as it implements the ECG-style sensor where the sensor detect the electrical impulse in the heart and the result is shown in beat per minute (BPM). The algorithm and improvement are made to ensure that interference is reduce to improve the accuracy.\(^8\)

**Comparison of existing system**

**Table 1. Comparison of existing system**

<table>
<thead>
<tr>
<th>Device</th>
<th>Stethoscope</th>
<th>Electrocardiogram</th>
<th>Chest Strap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit of Measurement</td>
<td>BPM</td>
<td>Millivolt versus time</td>
<td>BPM</td>
</tr>
<tr>
<td>Accuracy</td>
<td>High</td>
<td>High for normal condition</td>
<td>High</td>
</tr>
<tr>
<td>Price range</td>
<td>RM 20 – RM 400</td>
<td>RM 3000 – RM 7000</td>
<td>RM 150 - RM 500</td>
</tr>
<tr>
<td>Advantage</td>
<td>It allows doctors to listen to sound that is produce by the lung, heart and abdomen. Any abnormal activities in body can be easily detected by using stethoscope.</td>
<td>Non-invasive Continuous monitoring Diagnostic tool for arrhythmias</td>
<td>Provide most accurate heart rate among other non-medical device.</td>
</tr>
<tr>
<td>Disadvantage</td>
<td>Air leaks may occur and cause the hearing process during heart rate monitor affected.</td>
<td>Only assesses electrical activity of the heart</td>
<td>Uncomfortable to be wear in certain activity.</td>
</tr>
<tr>
<td>What It Can Detect or Diagnosed</td>
<td>It can detect sound in the body of patient and any murmurs also can be heard and detect if any further investigation need to be done.</td>
<td>Abnormally fast/slow or irregular heart rhythms. Abnormal conduction of cardiac impulses.</td>
<td>Chest strap can only detect the heart rate but cannot diagnose any heart condition.</td>
</tr>
</tbody>
</table>
HARDWARE REQUIREMENT

The devices used in this project were Particle Photon, Pulse Sensor, USB 2.0 Micro-B 5 Pin, and Solderless Breadboard.

Particle Photon (Header)

Particle’s IoT (Internet of Things) hardware development board, the Photon, use to build a connected project. Particle has combined a powerful 120MHz ARM Cortex M3 microcontroller with a Broadcom WiFi chip in a tiny thumbnail-sized module called the PØ (P-Zero).

These specific Photons come with headers, making prototyping easy as each board can plug directly into standard breadboards and perfboards, and may also be mounted with 0.1” pitch female headers on a PCB. The small form factor is ideal for IoT projects with cloud-connectivity. To get you started quickly, Particle has added a rock solid 3.3VDC SMPS power supply, RF and user interface components to the PØ all on a small single-sided PCB.

Pulse Sensor

The Pulse Sensor Amped is a plug-and-play heart-rate sensor usually used for Arduino. It essentially combines a simple optical heart rate sensor with amplification and noise cancellation circuitry making it fast and easy to get reliable pulse readings. Also, it sips power with just 4mA current draw at 5V so it’s great for mobile applications. Simply clip the Pulse Sensor to your earlobe or fingertip and plug it into your 3 or 5 Volt Particle and it will read the heart rate.

Solderless Breadboard

Solderless breadboard is a construction base for prototyping of electronics and used to connect two electronic components which is Particle Photon and Pulse Sensor. Solderless breadboard has 400 tie-point, 2 power lanes with tie-point 100 and 1 double strip with tie-point 300. It size is 8.2x5.5x0.85 CM. It made up from plastic housing associated with metal contact clips. It accepts wire with diameter 20-29AWG. Voltage/Current: 300V/ 3-5A.

USB 2.0 Micro-B 5 Pin

USB 2.0 Micro-B 5 Pin is a connector cable with type A end that connect Particle Photon with to the power supply in order to make the particle photon work and able to link to application.

SOFTWARE REQUIREMENT

Unity and Vuforia are the main platform of building application for this project. In addition, particle application also used to monitor the particle photon.

Unity

Unity is a cross-platform game engine developed by Unity Technologies, which is primarily used to develop both three-dimensional and two-dimensional video games and simulations for computers, consoles, and mobile devices. In this project, Unity version 2017.3 has been used to develop the application.

Vuforia

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time. In this project, Vuforia 7 has been used to develop the project.

Particle

Particle is an application to setup the particle photon to the Wi-Fi. The application allows us monitor our particle photon and provide information of the device such as ID of the device, IP address of the device and the time of the last activity is recorded. It also provides action for user to flash thinker and refresh the data.
PROJECT DESIGN

The main menu of this application consist of four option which are PLAY, HELP, TIPS, and QUIT.

Refer to Fig 2 to see the flow of application.

Refer to Fig 3. System Architecture for ARHeartRate application

SYSTEM ARCHITECTURE

In the system architecture, there is four main parts which is User, Hardware, Software and the Output of the system. For user part, the most crucial element is to get the input from user in term of getting heart rate from the user. In hardware part, there will be three components which is button badge, laptop’s camera, and composite device which is combination of pulse sensor and particle photon. In this system, button badge will act as a marker for detection to project the model in the scene. Pulse sensor and particle photon were linked and integrated with coding to make it both of the component works. Laptop’s camera is used to produce superimpose effect where the ribcage and the heart will be reflected on user body. The real time heart rate of the user will detect by using the pulse sensor where it uses infrared light to read the heart rate.
Advantages And Limitation

The main advantage of this ARHeartRate is provides a visualization of upper part of human body which is ribcage and the heart model. To improve the experience of the user, the ribcage has been set to maps the user body once the marker is scanned. Moreover, the heart has been animate and the user can see and hear the heart beating. To make the application easier to use, the marker of this application has been design in form of button badge, where it allows the user to interact with application without the need to hold the marker.

![Figure 5. 3D model maps to user’s body and Marker design for ARHeartRate application](image)

Although the application has its own advantage, this application also has its flaws. The main limitation of this application is the pulse sensor is over sensitive where value of the heart rate often changes during measurement if the pulse sensor is move and expose to noise.

Conclusion and Future Work

In conclusion, this project has been successfully developed to achieve certain objective in visualizing heart beating process using real time heart rate detection. By having this project, we hope that user is motivated to do frequent check of their heart rate hence they can monitor their health as well. User can also get information about best practices to ensure their heart is healthy. For future work, the application should include the ability to store history of user heart rate and allow the user or doctor to monitor the heart rate of the user remotely. The proposed model will be further evaluated by using usability evaluation (heuristics evaluation and questionnaire).

Acknowledgement: We would like to thank all the people who have directly or indirectly contributed to this project. This project is a part of final year project of Faculty of Information and Communication Technology, Universiti Teknikal Malaysia Melaka.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


Protective Effect of Various Lyoprotectant on the Survival of Antineoplastic Drug Producing Serratia Marcescens

Kavitha.R¹, Damodharan.N²
¹Associate Professor; ²Professor, Department of Pharmaceutics, SRM College of Pharmacy, SRMIST, Kattankulathur

Abstract

More effective method of long time storage of the microbes is lyophilisation and cryopreservation. To enable cell survival rate of bacteria during the drying process, lyoprotectant usually added before freezing. Serratia marcescens is a bacterium recognised as the producer of prodigiosin drug which showing promising antibacterial, antifungal, immunosuppressant and anti-proliferative activity in hematopoietic cancer cells. The aim of this current research to investigate the influence of lyoprotectant on the viability of Serratia marcescens during lyophilisation. Several additives were tested as protective agents like sucrose, mannitol, skim milk, bovine serum albumin and sucrose with BSA combination. The effect of drying adjuncts on survival was correlated to their interaction with the bacterial membrane by determination of cell viability by plating and SEM images. Cellular viability during storage of exponential phase cells remained highest for cells dried in the presence of 10%silk milk and 10%sucrose with 5%BSA combination. The result suggested that the possibility of achieving a good formulation system influenced by the type of lyoprotectants used.

Keywords: Lyoprotectant, Serratia marcescens, Mannitol, Bovine serum albumin, SEM analysis.

Introduction

Starter culture plays an essential role in the fermentation process of dairy, food and fermentation industries. Awareness is increasing about culturable diversity, and the development of modern cultivation approaches is continuously improving the numbers of new and previously uncultivated taxa of microorganisms in culture collections. Cultivation and characterisation of microorganisms alone are not adequate without preservation techniques that do not alter the morphology, phenotypic or genotypic stability of pure strains. Careful preservation is imperative for future research, teaching and industrial applications¹,².

Members of genus Serratia well recognised as the producer of bioactive compounds. Serratia spp are gram-negative bacteria, classified in the large family of Enterobacteriaceae some strains of Serratia marcescens produce a water-soluble pink pigment pyrimidine, L-2-(2-pyridyl-D/-pyrroline-5-carboxylic acid) [Prodigiosin]³,⁴. Prodigiosin has antibacterial, antifungal, antimalarial and cytotoxic properties and it has suggested for the treatment of autoimmune diabetes and collagen-induced arthritis⁵,⁶. The chitinolytic machinery of S. marcescens is of great interest because it is one of the best characterised chitinolytic machinery known to date⁷. A synergistic inhibitory activity of prodigiosin and chitinolytic enzymes was observed against spore germination of Botrytis cinerea⁸.

Metabolically active preservation methods such as subculture and maintenance under oil can lead to a decrease in the production of these valuable secondary metabolites. Since secondary metabolite synthesis only decreases during effective preservation methods, utilising inactive methods are necessary. However, cell damage occurs during the preservation process and even during the storage of inactive cultures. Therefore, the preservation of highly productive variants even at efficient conditions can impede the production of the biologically active substance⁹. Lyophilisation is the preferred long-term preservation method in most culture collection process due to the low-cost maintenance and ease of transportation of lyophilised cultures. It gives satisfactory results for the preservation of many microbes¹⁰.
Lyophilization is the sublimation of water from a frozen sample, and it comprises (i) freezing, (ii) primary drying, and (iii) secondary drying\(^8\). Lyophilisation exerts stress on the cells during vacuum desiccation and cells raised under stress many respond better to lyophilisation\(^8\). A culture at stationary phase and low pH condition survived better during lyophilisation than did cells in log phase grown at circumneutral pH. In general, a suspension medium with \(1 \times 10^8\) cell mL\(^{-1}\) or more gives a better recovery, whereas glass-forming cryoprotectants preferred over a eutectic crystallisation salt\(^1,11\).

The major causes of loss of cell viability during freeze-drying are attributed to ice formation high osmotic shock due to the high concentration of internal solutes with membrane damage, macromolecule denaturation and the removal of water, which affect the properties of many hydrophilic macromolecules in cells\(^12,1\). The survival rate of bacteria during this process, cryoprotective is usually added before freezing to prevent or reduce cell death during freeze-drying and subsequent storage\(^13\). An ideal cryoprotectant should meet all of the following criteria: be highly water-soluble, penetrate inside the cell, have low toxicity, be non-reactive, and not precipitate at high concentrations\(^14\).

Traditional classification of cryoprotectants additives (CPAs) depends on the rate of penetration: i) Additives which enter rapidly, in 30 minutes approximately, Eg: methanol, ethanol, ethylene glycol (EG), Dimethylformamide. ii) Additives which penetrate slowly, Eg: glycerol, mono-, oligo and polysaccharides, mannitol, dextran, sorbitol, albumin, protein, gelatin, polyethylene glycol (PEG) at 10-40%. Some cryoprotectants additives only penetrate the cell wall and do not penetrate the cytoplasmic membrane and categories: 1) Cryoprotectants penetrating both cell wall and cytoplasm membrane- glycerol and MeSO. 2) Cryoprotectants penetrating the cell wall but not the cytoplasm membrane: mono and disaccharides, amino acids. 3) Cryoprotectants were not penetrating cell wall: dextran, PEG-6000 polysaccharides\(^15,16\).

The application of a variety of chemical compounds either alone or in addition to skim milk has reported. The mono and disaccharides glucose, sucrose, maltose, lactose and trehalose, as well as maltodextrins, increased the viability of lactic acid bacteria during freezing and freeze-drying\(^17,18,19\). The fructo-oligosaccharides significantly increased survival of stationary phase cells of Lactobacillus reuteri TMW1.106 after freeze-drying and storage by increasing membrane fluidity. The addition of the prebiotics FOS, inulin and polydextrose also enhanced survival of Lactobacilli rhamnosus during spray-drying\(^1\).

At the combination of sucrose and monosodium glutamate and sodium caseinate, skim milk shown higher viability on freeze-drying of Streptococcus thermophiles NCIM 2904\(^20\). The optimum protective medium for Lactobacillus bulgaricus LB14 was reported with the combination of sucrose, glycerol, sorbitol, and skim milk\(^12\). Consequently, some studies have examined the potential role of additives in suspensions of microorganisms such as sugars, polyols, amino acids, peptides and proteins in their survival throughout freezing and drying of lactic acid bacteria and Streptococcus thermophiles\(^13,20\). Although techniques of lyophilisation well established, optimisations of lyoprotectants are still necessary for certain microorganisms.

In this research work comprehensively investigated the preservation of aerobic bacteria by lyophilisation process. The bacterial fitness evaluated by viability using different non-toxic protectants like sucrose, skim milk, mannitol, BSA and sucrose and BSA combination to improve freezing and freeze-drying resistance. The efficient cryoprotection of Serratia marcescens reported at the first time.

**Materials and Method**

**Microorganism**

*Serratia marcescens* KR isolated in our laboratory from SRM Institute of Science and Technology, Kattankulathur. The microbe obtained from the marine crustaceous soil sample. The strain was characterised and confirmed as *Serratia marcescens* then maintained in nutrient broth.

**Culture Condition**

The culture was initially passed on solid nutrient agar and then in liquid nutrient broth. After inoculation, the cultures incubated for 24hr at 37°C followed by a new seeding a liquid medium, Then again were incubated for 24hr at 37°C.

**Protective Agents**

The substances used to protect cells during
lyophilisation were bovine serum albumin (BSA) at the concentration of 5%, mannitol, sucrose and skim milk at a concentration of 10% and the combination of sucrose and BSA at 10% and 5% as respectively. The protective media were prepared by suspending these agents in distilled water and were sterilised at 121°C for 15 minutes.

Table 1. The composition of the different formulation and properties of the dry formulations

<table>
<thead>
<tr>
<th>S.NO</th>
<th>LYOPHILISATION MEDIUM</th>
<th>PROPERTIES OF DRY FORMULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10% Sucrose</td>
<td>Semi-solid form</td>
</tr>
<tr>
<td>2</td>
<td>10% Mannitol</td>
<td>Amorphous structure</td>
</tr>
<tr>
<td>3</td>
<td>10% Skimmed milk</td>
<td>Porous structure</td>
</tr>
<tr>
<td>4</td>
<td>5% Bovine serum albumin</td>
<td>Amorphous structure</td>
</tr>
<tr>
<td>5</td>
<td>10% Sucrose and 5% BSA</td>
<td>Porous with amorphous</td>
</tr>
<tr>
<td>6</td>
<td>Water(Blank)</td>
<td>Sticky powder</td>
</tr>
</tbody>
</table>

Preparation Procedure

Cells in the early stage of the stationary phase were harvested under aseptic conditions by centrifugation at 10,000rpm for 10min at 4°C in a cooling centrifuge. The growth medium was decanted, and the harvested cells were washed twice in aseptic distilled water and centrifuged again. Each pellet was resuspended in the experimental protective medium to make a cell suspension containing approximately $1.0 \times 10^{10}$ CFU/ml. The suspension was incubated for 20 minutes at room temperature and shaken continuously to allow cell adaptation.

Lyophilization

Aliquots (5ml) of each suspension were transferred into three sterilised vials (8ml) and were frozen at -20°C overnight. After overnight storage in the freezer, samples connected to a lyophilizer operating at 1Pa pressure and -70°C for 24hrs.

Rehydration

After freeze-drying, samples were immediately brought to their original volume (5ml) with each rehydration medium at 25°C. Then, samples were homogenised for 1 min with a Vortex mixer and incubated at room temperature for 9 minutes.

Determination of Cell Viability

The number of viable cells before and after freeze-drying determined as colony forming units (CFU). Decimal dilutions were prepared from the suspension before freezing, and suitable dilutions were plated on nutrient agar consisting of yeast extract 5g, beef extract 5g, peptone 5g, sodium chloride 0.5g and agar 15g (pH 7.20.2), by the drop count technique. The suspended samples were plated and incubated at 37°C for 24 hr and colonies were counted.

The viability of cell suspension for each protective medium was calculated using the following equation:

$$Viability\% = \frac{\text{Viable cells after freeze-drying (CFU/ml)} - \text{drying (CFU/ml)}}{\text{Viable cells before freezing (CFU/ml)}} \times 100$$

Scanning Electron Microscopy

The small amounts of matrix/bacteria take out of the vials and fix it on an SEM stub. Load the SEM holder in the sputter-coater (Thermo VGScientific Polaran SC7640 used in the present work) and coat the sample with a few nm of Au/Pd for Pt. In these experiments, the sputtering parameters were 1,900 V, 20mA and 20 sec, for a 5-10nm Au/Pd coating. The coating reduces electric charging during image acquisition. It is recommended to start with a thin coating and, if charging persists and causes
image artefacts, the sample should be coated again. Load the SEM holder in the SEM chamber. Appropriate imaging parameters selected. For the instrument 5kV accelerating voltage, spot size 3, a working distance of 5mm and the secondary electron detector used.24,25,26

Result and Discussion

Microbial culture preservation is currently limited to the bioresource centres or culture collections. Different groups of microorganisms give widely varied responses to the same preservation method. Even the different strains of the same species may show different responses regarding survival and durability with the same preservation strategy. Microbiologists should consider the preservation of medically, ecologically and industrially important strains as paramount or representative members from each group should be optimised for routine preservation. Preservation and storage of microorganisms by various methods used from decades. From a large number of methods used of storage of microorganisms, the more effective methods are long-term cryopreservation and lyophilisation. The objective of the current study to determine the influence of various lyoprotectants used on the survival rate of Serratia marcescens strains during the lyophilisation process. The most efficient protectant for longer survival and maintenance of genetic stability required in the production of secondary metabolites evaluated following preservation stress.

Lyophilisation is one of the most common methods for the conservation of micro-organism in the collections due to storage conditions is 1-4°C which affords easy transportation of microbes. Membranes are primary targets of freezing and desiccation injury, and membrane damage is a catalyst of cell death during drying and dry storage. The membrane integrity, as well as the viability of stationary phase cells, remained higher compared to exponential phase cells. The acquisition of increased freezing and drying resistance in stationary phase Lactobacillus reuteri TMW 1.106 were studied.

The critical factor for a formulation to support cell survival is the capability of the formulation ingredients to replace water during dehydration, thus maintaining the structure of the proteins and membranes of the cell also in the dry state. Our experimental result shows the mannitol and BSA forms an amorphous powder with high quantitative formexhibited eminent cake properties whereas skim milk formed porous structured the quantitative amount, sucrose produced semi-solid end product not given any powder with our lyophilisation condition (Table:1). It has predominantly hypothesised that sucrose acts by verification process, forming a thick, viscous layer around microbes and require high activation energy for sublimation. In this context, the observed melt-back phenomenon could be possibly due to inability to achieve very high activation energy, which led to the formation of a stagnant viscous layer of sucrose around microbes resulting in melt-back of cake. This phenomenon was regarded as critical stability and is generally unacceptable for the lyophilised sample. These products often result in loss of viability and reduced stability of Serratia marcescens. In this regard, the lyophilised product of sucrose incorporated with Serratia marcescens renounced for further characterisation studies.

When the sucrose added with 5%BSA, it produced amorphous structure and easy to quantify- the images of the lyophilised samples represented in fig:1, without any lyoprotectant act as blank in this study. The amorphous structure was beneficial for shielding and keeping cells separated. Fortunately, our result showsmannitol, BSA, Sucrose and BSA combination formulations become amorphous after lyophilisation.

![Figure 1. Lyophilized form of Serratia marcescens with different lyoprotectants.](image)

i) Blank (without any protectant) ii) 10% mannitol iii) 10%skim milk iv)5% bovine serum albumin
v) 10% sucrose + 5% BSA
vi) 10% sucrose

The difference exhibited in cell survival in this study indicates that certain additives are more effective than others in protecting *S. marcescens*. The current research shows that sucrose with BSA and skim milk had the most lyoprotectant activity among the other tested lyoprotectant for Serratia marcescens in the freeze-dried state. Compatibility and availability of skim milk, in addition to its low cost, justify its selection as a suitable protectant for large-scale preservation of industrial strains. Since skim milk contains 32.0%–35.7% protein and 48.4%–54.1% lactose, it is a preferred protectant in the preservation of bacteria (Fig:2)

![Figure 2. Comparative effect of different lyoprotective agent on *Serratiamarcescens* viability after freeze-drying and rehydration](image)

BSA it gave noticeable protective for the viability of the microbes lyophilised sample. The final cell viability obtained using mannitol as protectant was only 40%, even though this compound provided the lyophilised material with a light and amorphous structure which makes rehydration easy.

![Figure 3. SEM images of *S.marcescens* in five different formulations: a) and b) –Blank (Water), c) and d)- 10% mannitol, e) and f) 10%skim milk g) and h) 5% BSA i) and j) 10%sucrose+5% BSA](image)
formulation leading to a uniform alignment of microbes despite its intermolecular variations and ensured cake formation with crystalline structure in electron microscopy. The image of the lyophilised formulation with skim milk, BSA and Sucrose with BSA combination formulations showed the discernible microbes in the sheets of lyoprotectant. Per Wessman et al.\textsuperscript{3} stated that whether the protectant and bacteria dispersed as crystals of dissolved in the polymer, does not correlate with cell survival. The viability of microbes may relate to the type of protectant added, and our result explained as same.

In conclusion, this study has shown that the recovery of cells of \textit{S.marcescens}, when subjected to lyophilisation, is dependent on the lyoprotectant used, the formation of amorphous solid which make the rehydration easy with higher productivity. An appropriate selection of these factors seems to be essential to ensure the long-term viability of these microorganisms. Future research must focus on demonstrating more lyoprotectant effect with their combinations in the survival of microbes. It would also be essential to study the shelf-life of lyophilised cells. These findings are necessary for the industrial development of microbial preservation.

\textbf{Acknowledgement:} The authors are grateful to thank SRM College of Pharmacy, SRM Institute of Science and Technology, Kattankulathur, to prove the required facility and support to carry out this research work.

\textbf{Ethical Clearance:} Taken from the committee

\textbf{Source of Funding:} Nil

\textbf{Conflict of Interest:} Nil

\textbf{References}


Comparison between Dry Needling Versus Kinesio Taping in Patients with Tennis Elbow

K.Guru Karthick¹, D.Malarvizhi², Komal Bhagat³

¹SRM College of Physiotherapy, MPT Second Year Post Graduate Student (Sports), ²Dean Incharge, SRM College of Physiotherapy, SRM Institute of Science and Technology, Kattankulathur, India, ³SRM College of Physiotherapy, MPT Second Year Post Graduate Student (Neuro), SRM Institute of Science and Technology, Kattankulathur, India

Abstract

Background: Tennis elbow or lateral epicondylalgia is a common painful condition of elbow which leads to pain over common extensor origin, muscle weakness, and reduction in upper limb function. There are very few researches are on muscle activity in the tennis elbow and the treatment of dry needling and Kinesiotaping. Objective: To examine the effectiveness of dry needling versus kinesio taping in patients with tennis elbow. Design: Quasi Experimental design

Methodology: It has two groups: Group A – Dry Needling and Ultrasound therapy (n = 5) and Group B – Kinesiotaping and Ultrasound therapy (n = 5), age: 17 to 50 years, genders, SRM medical college hospital and research center, Kattankulathur.

Outcome Measures: Pain Pressure Threshold and Patient Rated Tennis Elbow Evaluation (PRTEE)

Result and Conclusion: From the results this is found that there was no significant difference of Pain Pressure Threshold and Patient Rated Tennis Elbow Evaluation between the Group A and Group B but there was significant difference of Pain Pressure Threshold and Patient Rated Tennis Elbow Evaluation within the Group. This concludes that there was effect in both dry needling and Kinesiotaping among patients with tennis elbow

Keywords: Tennis elbow, Dry needling, Kinesiotaping, Pain pressure threshold, PRTEE

Introduction

Tennis elbow is a common painful condition in which outer aspect of the elbow becomes sore and tender at the lateral epicondyle. It often occurs after the strenuous overuse of muscles and tendons of forearm near the joint. Tennis elbow is responsible in affecting daily activities and job due to pain. Not surprisingly, playing tennis or other racquet can cause this condition. However several other sports activities can also put you at risk.

Lateral epicondylitis involves the muscle and tendons of the forearm. Forearm muscle extends the wrist and fingers. The forearm tendons are the extensors which attaches to the bone on the lateral epicondyle. The tendon usually involved is extensor carpi radialis brevis. The overuse of extensor carpi radialis brevis leads to this condition¹, ², ⁴, ⁸, ¹⁰.

Lateral epicondylitis is directly related to activities that increase the tension and hence the stress of the wrist extensor and supinator muscles resulting in muscular contractile overloads that may occur concentrically or eccentrically. This clearly describes an overuse syndrome that is characterized by excessive forearm use with respect to intensity and duration¹¹.

Also known as myofascial trigger point needling, dry needling is the invasive procedure of the use of either filiform needles or hollow-core hypodermic needles for releasing the tension and myofascial pain.

Corresponding author:
Prof. D. Malarvizhi
Mail id: malarvizhi.d@ktr.srmuniv.ac.in
It is a physiotherapy procedure which helps in treating abnormality caused due to trigger points. It is an effective therapy to treat muscular tension and spasm. Many researches prove to be beneficial in treating lateral epicondylitis. Several articles concludes that 5-6 additional follow ups improves the pain and ADL activities.  

Kinesiology tape is a thin, stretchy, elastic cotton strip with acrylic adhesive which is mainly used for treating athletic injuries and many of the physical disorders. For the first decade after introduction, practitioner in Japan were the main user of this therapy and by 1988 the tape had been adopted by Japanese Olympic and professional athletes. It relieves pain, reduces swelling and inflammation, accelerates recovery from bruises and contusions, prevents muscle spasm and cramping etc. Kinesio taping has proved to be effective in treating pain intensity, grip strength and also increasing functional performances of the patient.

So the purpose of the study is to compare the effectiveness of Dry needling versus Kinesiotaping among tennis elbow patients.

**Methodology**

This study was a quasi experimental study; the type of the study was pre and post type. The inclusion criteria were based on population with both genders, patients presenting with pain over lateral side of the elbow, subacute patients (7th to 45th day). The patients with positive mills maneuver were included and with any of the trigger points over extensor carpi radialis, extensor carpi radialis brevis, Supinator and Brachioradialis. Therapist has to check for trigger point and needling has to be done on those muscles for 1 – 2 minutes. After the dry needling procedure over the muscle attachment and myofascial trigger points of muscle belly and musculo-tendinous junction the areas were examined for post needling bleeding.

**Group A: Dry Needling**

The patient position was in sitting with forearm in mid prone position. The needle size was 25 mm. Most commonly Affected Muscles: Extensor digitorum, Extensor carpi radialis longus, Extensor carpi radialis brevis, Supinator and Brachioradialis. Therapist has to check for trigger point and needling has to be done on those muscles for 1 – 2 minutes. After the dry needling procedure over the muscle attachment and myofascial trigger points of muscle belly and musculo-tendinous junction the areas were examined for post needling bleeding.

**Group B: Kinesiotaping**

The kinesiotaping technique was Inhibitory technique (insertion to origin) and the tension was Paper – off tension (15 – 25%). Placing the base of kinesio Y strip near the wrist in the region of the radius styloid process, with no tension. The elbow should be in slight flexion with wrist in neutral position. Have the patient move in to elbow and wrist extension with wrist ulnar deviation. The inferior strip should follow the inferior aspect of the common muscle group. The superior strip should follow the superior aspect of the common muscle group. Both tails should end directed towards the lateral epicondyle of the humerus. Lay down the distal 1 – 2 inches with no tension. Initiate glue activation prior to any further patient movement. Apply a space correction technique, tension on base, for the area of pain. Being by placing the base of the kinesio Y strip below the area of pain with the elbow in neutral position. Do not cross over the lateral border of ulna – this may cause pain in this region.

After two weeks of treatment the post test will be assessed.

**Data Analysis**

The observed data were calculated and
Graph 1: Pre and Post test values of Pain pressure threshold test among Group A subjects treated with dry needling and Group B subjects who treated with kinesiotaping.

This graph shows that there exist a significant difference between Pre and post-test of Pain Pressure Threshold among Group A and B.

Graph 2: Pre and Post test values of PRTEE among Group A subjects who treated with Dryneedling and Group B subjects who received Kinesiotaping

This graph shows that there exist a significant difference between Pre and post-test of Patient Rated Tennis Elbow Evaluation among Group A and B.

Graph 3: Comparison of PPT and PRTEE between Group A and Group B

This graph shows that there is no significant difference between comparison of PPT and PRTEE between group A and group B.

Discussion

The aim of our study is to find out the effect of dry needling and Kinesiotaping in patients with tennis elbow, and compare the effectiveness of dry needling versus Kinesiotaping in patients with tennis elbow.

Our study results show that there was significant difference in PPT and PRTEE within groups of A and B. The Group A PPT values are Pretest M=1.12±0.36 and Post test M=2.60±0.49, t=-22.31 and P=.000. The PRTEE values are Pretest M=72.2±11.07 and Post test M=41±6.67, t=12.69 and P=.000. The Group B PPT values are Pretest M=1±0.36 and Post test M=1.66±0.42, t=-6.887 and P=.002. The PRTEE values are Pretest M=58.80±14.41 and Post test M=41.80±13.55, t=-6.208 and P=.003.

Our study results show that there was no significant difference in PPT and PRTEE between Group A and Group B. The PPT values of Group A was M=2.6±0.49 and Group B was M=1.6±0.42, t=3.205 and P=.013. The PRTEE values of Group A was M=41±6.67 and Group B was M=41.8±13.55, t=-0.118 and P=.909.

Sukumar et al (2014)\(^1\) concluded that both dry needling and low level laser therapy shows improvement in functional performance and reducing in pain. In this study also there was a improvement within group which is significant and between group it was no significant which same like our study.

Paras Joshi (2017)\(^2\) done a single case study using Tailor Made Physiotherapy Protocol with Dry Needling And Kinesio Taping and he found the results Pain came down to 0.5 from 9 on NPRS. Full ROM achieved at elbow. There was absolutely no complaint in performing daily activities. Chronic tennis elbow can be treated with tailor made physiotherapy treatment.

In our study most of the patient felt immediate pain relief after the dry needling treatment when compare to Kinesiotaping undergone patient. Our protocol was 3 session for 1 week, if it may keep for 2 weeks we could able to drastic improvements.

Conclusion

This study concluded that there was effect in both dry needling and Kinesiotaping among patients with tennis elbow.
Limitations

Limitation of this study was the sample size was small and the duration of the treatment session was less.

Recommendations

The future recommendation was to have larger sample and longer duration. They can analyze the pre and post of muscle activity after the dry needling and Kinesiotaping in tennis elbow patients using EMG.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


2. César Fernández-de-las-Peñas et al. Deep dry needling of the arm and hand muscles 2013.


4. M.A. WYMORE, D. BLACKINGTON OT Dry Needling: A Case Study in Treating Tennis Elbow, West Texas Rehab Center, San Angelo, TX, United States.


Effect of Incentive Spirometry and Balloon Exercises to Improve Pulmonary Function for Type 2 Diabetes

D Malarvizhi1, Geetha Anandakrishnan2
1Dean Incharge, 2BPT Final Year Student, SRM College of physiotherapy, SRM institute of Science and Technology, Kattankulathur, India

Abstract

Background: Diabetes is a systemic disease with well-known complications involving eyes, kidneys and nerves. Patients with diabetes mellitus may present pulmonary abnormalities associated with chronic hyperglycaemia due to extensive pulmonary micro vascular circulation and abundant connective tissue raising in the lung. The possible reduction in the lung function is due to respiratory muscle weakness that is due to non-enzymatic glycosylation of connective tissue protein such as collagen in pulmonary tree and chest wall. Objective: The purpose of this study was to see the effect of both incentive spirometry and balloon exercise on pulmonary function for type 2 diabetes. Method: 30 samples (15 diabetic group and 15 control group) with age group between 40-60 yrs., with 6 month-10 years duration of diabetes were included in the study. Pulmonary function test was performed using computerized spirometry. PFT values were less in diabetes when compared to controlled group. Intervention was Incentive spirometry and balloon exercises were given for one month of duration. Outcome measures were computerized spirometry. Results: After one month of intervention pulmonary function test was again taken it shows that there is increase in the PFT values for both group A and B when compared to the pre-test. Conclusion: As with statistical result the people who were given incentive spirometry and balloon exercises have shown a significant improvement in pulmonary function. So, it is concluded that these exercises have effect on lung function in diabetes.

Keywords: diabetes, spirometry, pulmonary function.

Introduction

Diabetes mellitus is a chronic systemic disease that is due to the deficiency of insulin produced by the pancreas or the insufficient use of insulin by the cells in the body. There are two types of diabetes in which type 2 Diabetes are most common for about 90% of the total population mostly with age group of above 45 years. Diabetes can only be managed and not cured. Usually its importance is not recognized until people suffer from diabetes1.

Diabetes is associated with the dysfunction and damage of organs namely kidneys, nerves, heart, lungs due to micro vascular and macro vascular damage of blood vessels that supplies these organs2. The etiology of type 2 Diabetes may be due to lack of physical activity, improper diet (higher intake of saturated fatty acids results in insulin resistance), obesity, malnutrition, alcohol, viral infection, stress3.

The impaired glycaemic control in diabetes may lead to reduction in lung function that is due to increased systemic inflammation4. Pulmonary dysfunction is due to thickening of walls of alveoli, alveolar capillaries and pulmonary arterioles5. It is also due to immune function impairment6.

Pulmonary function test is the test that is done to rule out pulmonary problems. Computerized spirometry is used to evaluate the lung function of the diabetic. Spirometry assess the lung volumes and flows suited to describe the effect of obstruction or restriction on lung function7. Forced Vital Capacity (FVC), Forced Expiratory Volume in one second (FEV1) and ratio of Forced expiratory volume in one second and Forced...
Vital Capacity (FEV$_1$: FVC) are the parameters that were assessed. Meo et.al reported that FVC, FEV$_1$, FEF were impaired in diabetic patients when compared to the normal people with no diabetes$^8,9$. It is also said that subjects with reduced lung function are at the high risk of developing diabetes mellitus. Engstrom and Janzon predicted that presence of diabetes may be due to decreased FVC, FEV$_1$, which are inversely proportional$^{10}$. The incidences of diabetes are most commonly associated with restrictive lung diseases than obstructive type of lung diseases. In restrictive lung disease both the values of FVC and FEV$_1$ will be low but the ratio of FEV$_1$ and FVC will be increased$^{11}$.

Normally breathing exercises can increase the pulmonary function. Rafaqat, Mushtaq Z, Tahir A, Shahzad MF has compared and proved that both incentive spirometry and balloon exercises are equally effective in patients with chest intubation after trauma$^{12}$. So the aim of this study is to show the effect of incentive spirometry and balloon exercises to improve the pulmonary function of diabetes.

Earlier they were studies that are done to retrain the inspiratory muscles in diabetes as there may be diaphragmatic paralysis that is due to phrenic neuropathy$^{13}$. And there were study done to report that there is reduced pulmonary function in diabetes$^{14}$. But there were no studies done to improve the pulmonary function of diabetes. So this study was done to find out the effect of incentive spirometry and balloon exercises on the pulmonary function of type 2 diabetes.

**Methodology**

Study design was experimental design, pretest and posttest type, 30 subjects between the age group of 40 to 60 years (15 – controlled group, 15 – chronic type 2 diabetes) and with the history of diabetes in duration of above 6 month to 10 years were included. Study setting was SRM medical college hospital and research Centre. History of exercise induced asthma, Osteoarticular disease, infectious disease, cardio pulmonary disease, regular alcohol tobacco consumption in last 6 month were excluded in this study. Outcome measure was computerised spirometry.

According to the inclusion and exclusion criteria 30 subjects were selected and divided into two groups, 15 in Group A – Experimental group and 15 in Group B – controlled group. The procedure was explained, and informed consent was taken to participate in the study and Institutional Ethical Committee approval also obtained before starting the study.

**Procedure**

On application of inclusion and exclusion criteria subjects were selected and pulmonary function test was done using computerised spirometry. The participants were asked to keep the mouth piece fully covered by the mouth and then to take deep inspiration followed by forceful expiration and then again inspire. Three tests were done and maximum of it were considered. Pulmonary function of both group A and B were evaluated. The values were then compared, and it showed that there were reduced FVC and FEV$_1$ in group A than group B.

Incentive spirometry and balloon exercises were taught and were asked to follow up for one month. Subjects were asked to inspire to their maximum in incentive spirometry. They were encouraged and motivated to increase the inspiratory capacity on seeing the raise of the balls. On progression they were asked to maintain the balls in the peak for five seconds and then relax.

The procedure for balloon exercise was, subjects were asked to sit straight, hold the balloon in front and asked them to blow to the maximum after the deep inspiration. This was repeated for 5 times in one sitting/10 repetitions/day. After one month of interventions posttest was done evaluating the pulmonary function using computerized spirometry.
Data Analysis

Table 1. Pretest Values Of Diabetes (Group-A) And Controlled (Group-B) Individuals

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GROUP</td>
<td>GROUP</td>
<td>GROUP</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>FVC</td>
<td>15</td>
<td>2.072</td>
<td>2.234</td>
</tr>
<tr>
<td>FEV₁</td>
<td>15</td>
<td>1.37</td>
<td>1.81</td>
</tr>
<tr>
<td>FEV₁:FVC</td>
<td>15</td>
<td>76.16</td>
<td>81.05</td>
</tr>
<tr>
<td>PEF</td>
<td>15</td>
<td>4.91</td>
<td>6.36</td>
</tr>
<tr>
<td>PIF</td>
<td>15</td>
<td>2.22</td>
<td>2.32</td>
</tr>
</tbody>
</table>

Table 1 shows pretest values of group A and group B

Graph 1. Comparision of Pretest Values of Group-A (Diabetes) and Group-B (Controlled)

Graph 2. Comparision of FEV₁: FVC Value of Group-A (Diabetes) and Group-B (Controlled)
Table 2. Pretest and Posttest Values of Type 2 Diabetes (Group-A)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PRE TEST</td>
<td>POST TEST</td>
<td>PRE TEST</td>
<td>POST TEST</td>
</tr>
<tr>
<td>FVC</td>
<td>2.07</td>
<td>2.57</td>
<td>0.28</td>
<td>0.19</td>
</tr>
<tr>
<td>FEV₁</td>
<td>1.37</td>
<td>1.84</td>
<td>0.30</td>
<td>0.36</td>
</tr>
<tr>
<td>FEV₁:FVC</td>
<td>76.16</td>
<td>79.34</td>
<td>2.71</td>
<td>1.77</td>
</tr>
<tr>
<td>PEF</td>
<td>4.91</td>
<td>5.93</td>
<td>0.52</td>
<td>0.20</td>
</tr>
<tr>
<td>PIF</td>
<td>2.22</td>
<td>2.54</td>
<td>0.36</td>
<td>0.26</td>
</tr>
</tbody>
</table>

Table 2 shows mean, SD, t- values, p values for pretest and posttest of FVC, FEV₁, FEV₁:FVC, PEF, PIF in type 2 Diabetes.

Graph 3. Comparision of Pretest and Posttest Pulmonary Function Values for Type 2 Diabetes

Graph 4. Pretest and Posttest FEV₁:FVC Values for Type 2 Diabetes
Results

Table 1, graph 1 and graph 2 shows that there is difference in Pulmonary Function Test values between diabetes and controlled group. Tables 2, graphs 3 and graph 4, shows pretest and posttest in the pulmonary function in group A.

Discussion

In this study there were total of 30 subjects in this mostly were female population as most of the males were excluded due to smoking history. Duration of diabetes ranged from 6 months to 10 years.

Diabetes mellitus produces changes in structure and connective tissues that affects eyes, kidneys, nervous system etc. Lung may be the target organ for diabetes as there is extensive circulation and abundant connective tissues. Several changes including non-enzyme glycosylation of connective tissue might be responsible for organ damage and diabetic myopathy. These lead to loss of elasticity, altered perfusion and also weakness of the respiratory muscles that is responsible for ventilation. Lung function may provide useful measures of the progression of systemic micro-angiopathy in diabetic. The possible reduction in the lung function is due to respiratory muscle weakness that is due to non-enzymatic glycosylation of connective tissue protein such as collagen in pulmonary tree and chest wall. so lung is exercised to increase its function and capacity by incentive spirometry and balloon exercises.

The Study was to find the effect of incentive spirometry and balloon exercises to improve the pulmonary function of diabetes. Incentive spirometry is basically an inhalation based method of breathing that encourages participants to increase their lung volumes. Whereas balloon blowing exercise is the exhalation technique that produces resistance to muscles of expiration. This increases strength of the respiratory muscles. Recently there is a study proved that incentive spirometry and balloon blowing exercise are equally significant in improvement of pulmonary function.

These exercises improve the pulmonary function of participants. Along with exercise, healthy food, eating at correct time, using stairs can help in the prevention of diabetes. Further dynamic breathing exercise can be taught for the improvement.

This study goes in hand with Mandava v et .al int J adv med (2016) which is concluded that there is pulmonary function changes in type 2 diabetes lungs. The changes include with reduced values of FVC, FEV1.

Ana paula, S CORREA and et.al stated that diabetes mellitus may present with pulmonary functional abnormalities associated with chronic hyperglycaemia. Engstrom and Janzon predicted that the presence of diabetes may be due to decrease in Forced Vital Capacity and Forced Expiratory Volume in one second.

All Rafaqat, Zaharamushtaq, AdilaJahir and FarrutchShahzad M has experimentally proved that incentive spirometry and balloon exercises are equally effective in patients with chest intubation after trauma. Incentive spirometry improves the elasticity in the lungs and balloon exercise increases the strength of the respiratory muscles by providing resistance.

Jackie A Thomas had recorded that incentive spirometry had significant effect in people health versus no physical activity. Meo et.al reported that FVC, FEV1, FEF were impaired in diabetic patients when compared to the normal people with no diabetes.

Conclusion

The study concluded that incentive spirometry and balloon exercise has significant effect to improve the pulmonary function in type 2 diabetes.

Limitation of this study was short duration; small sample size and only chronic type 2 diabetes were given exercises. Recommendations are type 1 diabetes can also be studied, sample size can be increased to see mass effect and the duration of intervention can also be increased to see the great difference in pre and post test.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

2. Stratton IM, Adler AI, Neil HA, Matthews DR, Manley SE, Cull CA, Hadden D, Turner RC, Holman


Design and Implementation of Health Care Video Monitoring System based on RTOS

B.Raja¹, Ayesha Firdous², A. Mohammed Ishak³, M.Anand⁴
¹Associate Professor, Dr.M.G.R Educational and Research Institute University, Chennai, ²Professor, Siddhartha Institute of Technology and Sciences, ³Assistant Professor, Siddhartha Institute of Technology and Sciences, ⁴Professor, Dr.M.G.R Educational and Research Institute University

Abstract

Generally in critical case patients should be monitored continuously for their Heart Rate, Body position and in body temperature. In the present paper, we are utilizing an original thought for nonstop monitoring patient’s health conditions. The health care scheme is concentrate on the estimation and observing different natural parameters of patient’s body like heart rate, body position and temperature utilizing a web server and video monitoring, where doctor can constantly monitor the patient’s condition on PC using an Internet. This paper depicts the implementation and evaluation of the execution of a health care monitoring system using Internet. To ensure quality and accuracy the proposed system has been field tested. The test results demonstrate that our system can measure the patient’s physiological information with a high accuracy. This project aims to design and demonstrate an innovative web based remote healthcare diagnostic system that provides vital medical data and live video images of a patient situated in rural area accessible to a health professional available elsewhere in urban centers resulting in better analysis and treatment of that patient.

Keywords: Video Monitoring, DCMI, RTOS and Multitasking.

Introduction

At present, patient physiological parameter embraces timing artificial estimation style at most hospital. For example, nurse goes to ward and measures patients’ body temperature consistently, manual records and draws body temperature evolving figure, which can be broke down by doctors as reference of disease determination. This term of conventional not only wastes nurses’ massive manpower, but also aggregation, query analysis to measurement result is varied, as well as cannot feedback in time when patient appear special condition, which can cause postpone of treatment time. Through analysis we can see, this kind of style has bigger limitation, especially, to those patients with infectious diseases, monitoring personnel is inconvenience to contact. So, aiming to this problem, by sensor technology, single chip microprocessor technology, etc, we design a wireless remote concentration system. This system uses wireless communication and serial communication interface technology to design, which makes up tradition system shortcoming. Through monitoring in real time, as well as communicating with monitoring computer, we can increase work efficiency, and has active function in saving medical source, etc.

Related Works

Wireless health monitoring system (WHMS) has drawn significant considerations from the exploration group and in addition industry among the most recent decade. Various and yearly expanding innovative work tasks have been posted in the paper. The health tracker, that can monitors user’s fundamental signs; for example, heart rate or heartbeat, blood pressure and breath rate could be actualized utilizing pressure sensors¹. The coordinated patient monitoring combining with electronic patient records, the principle difficulties to expanding strength of “e-health” application to a level at which clinically helpful. The disadvantages of electronic patient record are extremely time consuming and costly to overcome this problem, using novelty detection task that allows a direct comparison without integrated, automatics methods².
The heart logo in beat sensor reaches skin and little LED sparkles at posterior of heartbeat sensor. For the most part Pulse sensor can be put on the fingertip or ear cartilage of the human body. The basic information sends to the mobile health care unit utilizing GSM communication. Heartbeat sensor communicated with the microcontroller which is arduino Undistinguishing proof (RFID) advancements enters the human services condition. Key information rates and the measure of the information collection in an assortment of smart health care utilize cases are talked about. At last they created fix sort wearable imperative observing device that numerous quantities of essential sensors, a performance processor and a dual mode Bluetooth receiver are incorporated.

The microcontroller based persistent non invasive cuff less blood pressure measurement system with a caution circuit for medicinal services observing system. Accuracy of the system is found in acknowledgment range by contrasting the results and the current regular systems. Heart rate or body temperature exceeds the standard range for any patient; the system can inform utilizing a disturbing circuit. The entire system is controlled by microcontroller ATMEGA8L.

The quick improvement of wireless technologies and the increases in communication transfer speed encourages the improvements of android based health care systems. Remote and flexible patient observing systems not just expand the portability of patients and therapeutic staff additionally enhance the nature of health care. In the improvements of remote patient monitoring frameworks, concentrated on patient’s details transmitting physiological signs by means of the Zigbee innovation. A few analysts have utilized the individual personal digital assistant (PDA) to gain and transmit physiological signs from patient’s space to the focal administration unit in the medicinal facility utilizing the remote advances utilizing remote monitoring system.

**System Architecture And Working Principle**

This project aims to design and demonstrate an innovative web based remote healthcare diagnostic system that provides vital medical data and live video monitoring of a patient situated in rural area accessible to a health professional available elsewhere in urban centres resulting in better diagnosis and treatment of that patient.

Various medical sensors are used to collect patient medical data and sent to the monitoring station for interpretation.

3-channel ECG

Body temperature

Body position

The system includes an advanced camera sensor to give live video pictures of the patient. In this architecture appeared in figure 1, three distinct sensors are utilized for monitoring the patient health services, for example, ECG sensor, Temperature sensor and body position sensor and which can directly connected with microcontroller and camera is used to interface the microcontroller. In this paper proposed video monitoring. So that effortlessly recognizes the patient’s health conditions.

**Figure 1. Health Care Monitoring System**

ECG sensor AD8232is used to monitor the regular heart beat of the patient’s which is used to find whether the patient’s heart rate is normal or abnormal. MEMS accelerometer is a body position sensor is used to find out the patient’s body position. Temperature sensor LM35 is used to find out the patient’s body temperature.

**Camera Image Acquisition using DCMI**

A project of this sort needs an extremely fit microcontroller with extensive measure of RAM memory. Along these lines STM32F429 from STMicroelectronics is picked as the fundamental MCU, which is one of the powerful microcontrollers right now accessible in the market. Figure 2 demonstrates that the hardware implementation. All the components connected in microcontroller.
The system comprises of a camera sensor to stream a live video feed. At the point when ask for is made the onboard microcontroller catches the JPEG pictures from the camera utilizing the implicit DCMI peripheral and begins to stream it once again the web in MJPEG pressure organize at an adequate rate between. The picture determination is settled at 470 x 272. The microcontroller has an extensive RAM memory region, around 256KB, which is an unquestionable requirement for this sort of use.

**Embedded Web Server**

The project utilizes an ARM Cortex-M4 based microcontroller that act as a web server that sends information to the customer side application. Any device with an Internet program, for example, advanced cell phone or PC/Laptop can be utilized to monitor the data feed. The customer side client is confirmed with an extraordinary client name and secret word before getting to streaming content.

**Security**

Before associating with the framework the client needs to enter the login username and secret word which is a genuinely necessary safety effort to keep others from getting to the substance. Once logged in, the user allowed accessing all the data including the video feed.

**Software Design**

Real Time Operating System (RTOS) is a multitasking working system planned for continuous applications. Real Time shows a hopeful reaction or response to a moment of its development. The expectant response describes the logical correctness of the result produced. The instant of the events evolution describes deadline for producing the result.

**RTOS Architecture**

The architecture of a RTOS is reliant on the many-sided quality of its organization. Great RTOSs are adaptable to meet distinctive arrangements of necessities for various applications. For simple applications, an RTOS as a usually comprises only a kernel. For more complex embedded frameworks, a RTOS can be a blend of different modules, including the kernel, organizing convention stacks, and different parts.

A working system large comprises of two sections: kernel space and user space. Kernel is the smallest and focal segment of a working framework. Its administrations incorporate overseeing memory and devices and furthermore to give an interface to programming applications to utilize the resources. Additional services such as managing protection of programs and multitasking may be included depending on architecture of operating system.
During the execution of an application program, particular tasks are insistently changing beginning with one state then onto the following. In any case, only a single task is in the running mode (i.e. given CPU control) whenever of the execution. In the process where CPU control is change beginning with one undertaking then onto the following, setting of the to-be-suspended task will be saved while setting of the to-be-executed task will be recovered. This technique of saving the setting of a task being suspended and restoring the setting of a task being proceeded is called context switching.

In this paper describes preemption. Preemption defines the capability to identify the task that needs a resource the most allocate it the control to obtain the resource. In RTOS, such capability is achieved by assigning individual task with appropriate priority level. Figure 6 and 7 shows that the priority level.

The kernel of a RTOS gives an abstraction layer between the application programming and equipment. This abstraction layer contains six primary sorts of normal administrations given by the portion to the application programming. Figure 4 demonstrates the six common service of an RTOS kernel.

**Task Management**

To achieve continuously real time application program, the application is decompose into small, schedulable, and consecutive program units known as “Task”. In real-time context, task is the basic unit of execution and is governed by three time-critical properties; release time, deadline and execution time. Deadline is the point in time by which the task must complete. Release time refers to the point in time from which the task can be executed and Execution time denotes the time the task takes to execute. Each task may exist in any of the four states, including running, ready, or blocked and dormant as shown in Figure 5.

**Figure 5. Possible States Transition of Tasks**

**Figure 6. RTOS Implementation**

**Figure 7. Task Description**
This paper describes about Ethernet task, Control task, sensor and local task. From this analysis it concludes that multitasking which plays an important role in health care RTOS.

Results and Discussion

The program is developed using Atollic True Studio IDE. Webpage is created for displaying the patient’s health information through doctor’s login. Only authorized users can login into the webpage. The doctor’s can access the patient’s information. In this project data are displayed by PC using Internet. After login into webpage, user can see the patient’s health records are shown in Figure 8.

![Real Time Patient Health Status Monitoring](image)

**Figure 8. Real Time Patient Health Status Monitoring**

Figure 9 describes video monitoring. This technique is very easy to identify the patient health related parameter details. Doctor can able to view the patient status and give the instruction to further improvement through the camera by video monitoring.

![Video Monitoring](image)

**Figure 9. Video Monitoring**

### Conclusion

This paper concludes that health care monitoring is done by utilizing sensor devices and reports all the sensor information to the doctor. Using four sensors identified with human health monitoring, for example, ECG sensor, body position sensor, temperature sensor and video monitoring which is controlled by microcontroller and brought information from sensors and all the sensor information through the doctor by using internet. Through this way, real-time remotely monitoring is achieved. With the developed system, achieve video monitoring but also an early treatment is possible. Thus, the proposed system makes the human’s daily life easier and more comfortable.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

### References


Artificial Voice for Speechless

K.S.Thivya¹, M.Anand²
¹Associate Professor, Dr.M.G.R Educational and Research Institute University, Chennai,
²Professor, Dr.M.G.R Educational and Research Institute University, Chennai

Abstract

Background: Communication is a must for human beings to express and those who cannot communicate are isolated in this society. This work finds a solution for human race, where people are dumb but not deaf. Objective: The Main purpose of the work is to create an artificial voice based on the tongue movement and with the help of the Phones of the language mapping table for the dumb person in order to meet their personnel and societal needs. Method: In this work the main features involved are tongue, lip movements and air flow. These features are fed in to the computer via parallel port. These features are in turn converted as data and mapped with the recorded Tamil phones. Results: In this work the mapping table is being done choosing Tamil as a language using Tamil grammar laws. Whereas the mapping table can be done for other languages also, using their own grammar laws. A device which fits inside the mouth is used to extract the tongue, lip movements and the air flow inside the mouth. This device in turn is connected to a computer to produce the artificial voice. Conclusions: As a test many letters and phrases were pronounced without making any sound. The computer pronounced the letter and phrases correctly via speaker.

Keywords: Parallel port, Mapping table, Tamil phones, Tamil fusion laws.

Introduction

In ancient days communication was very poor because it was done only through actions, later on language came in to existence. So people started to communicate orally with each other by means of language. There are around 6909 languages in existence. This statistical figure shows the importance of communication. There are three categories of dumb people. (i) Dumb by birth (ii) dumb due to accidents (iii) dumb due to cancer and other diseases. Generally cancer and especially throat cancer has been a disease of the older men with history of tobacco and alcohol use. However, with the rise in HPV infections, incidence in younger people is rising. In Tamilnadu alone 12,260 people are affected due to throat cancer per year. Mostly 70% of the patience with throat cancer looses their voice. Since they cannot speak they loose their communicating power and start feeling isolated, which in turn leads to mental depression. This work is focused only on dumb people in order to provide artificial voice for the speechless.¹

Dumb only

This device can only be used for dumb people. The device cannot be used for deaf and dumb people since deaf people cannot hear sound and are not aware of the language phones. The main criteria of the work are based on the language phones and the movements of tongue, lip, and air flows. For the above reasons this device cannot be used for deaf and dumb people. The actual process involved in the speech is the usage of organs such as the lungs, vocal cord, the mouth, tongue and teeth etc. The main objective of the work is to produce artificial voice even if the vocal cord is removed due to any reasons.¹, 6, 11, 13, 14

Tamil language

In this work a mapping table is done using Tamil phones. Tamil is an ancient language. It is one of the official language in Indian union territory of Pondicherry and a state in India is named as Tamil Nadu as majority of tamilians reside there. Tamil is also an official language of Sri-Lanka and Singapore. In 2004, Indian government declared Tamil as a classical language and it is considered to be one of the 22 scheduled languages of India.²⁰ More than 55% of the epigraphically inscriptions (about 55,000) found by the Archaeological Survey of

DOI Number: 10.5958/0976-5506.2019.00886.6
India are in the Tamil language. There are 247 phones in Tamil grammar including 12 vowels and 18 consonants. In the mapping table the 12 vowels and 18 consonants covers all the 247 phones. For these reason thirty phones only has to be covered in the mapping table (12 vowels and 18 consonants).  

Method

The work starts with a ceramic hard palate. The ceramic hard palate contains metal points. The metal points are in turn connected with the NOT gate IC 7404. When the tongue touches the metal point 5v signal is produced. One end of the electrode is connected to the ground and the other end is placed on the hand. This detection circuit detects the input. Two mikes are used, one to detect the airflow in the mouth and the other one to detect the air flow in the environment. According to the environmental noise the threshold value is set. By using the movement of the lip, tongue and air flow the corresponding thirty phones can be identified. These thirty phones are further simplified by taking only seven vowels and thirteen consonants in to account. By using wonderful fusion laws given in Tamil grammar book like NANNOOL we are able to derive all the words pronunciation from these twenty phones. The airflow in the nose and the mouth can be differentiated using the mike. By this way we can further simplify six phones called as MELLINAM. In remaining fourteen phones two phones have unique positions of lip touch with incisors teeth and tongue touch with incisors. Out of the other twelve phones three can be identified with lip contraction and dilation. One phone can be identified by the touching of both upper and lower lips. After, all the simplifications only eight different positions of the phones has to be identified. According to the Tamil fusion law even though two phones produce same sound, one metallic point is enough in the ceramic palate, because the two phones can be differentiated by airflow. These data are sent to computer via parallel port. Using mapping table the computer pronounce the corresponding phones.

Block diagram

The following block diagram (fig 1) can simply explain the process involved and hardware setup in this work. The ceramic hard palate is connected to detection circuit which detects the position of the tongue touching on hard palate. The output of detection circuit is connected to the multiplexer circuit. This circuit allows all the eight inputs in to computer via parallel port by allowing four inputs at a time. By scanning two times all the data’s are registered into the computer.

Parallel Port

Eight moulds are drilled on the ceramic palate. The drilled holes are filled with metal and insulated wire which is connected to the metal point. The other end of the insulated wire is connected to the detection circuit. The ceramic hard palate is categorized as (I) front (II) lower middle (III) middle and (IV) back side. In these fronts, lower middle, middle and backside ceramic hard palate two holes are drilled in each one. The position where the tongue touches on the hard palate can be identified using the detection circuit.

Air flow detection

As mentioned earlier, six phones are originated from nose. This can be identified by detecting the airflow. This detection of air flow may be confused with the normal breathing. In order to avoid the confusion, the air flow in the mouth is detected. For detecting this air flow,
microphone is used. The microphone is connected to the computer via audio jack. The microphone is faced towards the mouth for detecting the air flow. Another microphone is used to set the threshold value which is placed facing the environment.

Detection circuit

The detection circuit is used for finding the tongue position on hard palate which in turn is interpreted as binary data. When tongue touches any metal point in ceramic palate, the corresponding data will be logical 1(5v). The NOT gate pins are connected by 330 kΩ series with 110 kΩ. The 330 kΩ is connected to earth and 110 kΩ is connected to +5v voltage source. When the tongue touches the metal point, body resistance comes parallel with 330 kΩ and the voltage drops across it. It gives logical 1 (+5v) as output. The detected output is sent to multiplexer circuit.

Multiplexer circuit

Multiplexer circuit can select 4 input data’s at a time and send to computer via 4-bit gates. When the selection line is 0 the lower four bit is selected and when the selection line is 1 the upper four bit is selected. For single movement the data is given as 8 sets of 4 bits into computer through parallel port, because parallel port can send only 5 bits at a time to a computer. The status port pins 10, 11, 12, 13 and 15 only can send data to the computer from external device. Here we are choosing pins 10, 11, 12, 13 for sending data to computer from 2-line to 1-line selector. The pin 15 is used as direct control by the user, when user is in mode of talking this will be enabled, so computer starts speaking, when this pin is disabled the computer will not give voice for the ordinary movement of mouth. Usually there are four sets of selectors or switches, these movements are synchronized i.e. All switches are ON or all the switches are OFF. When logical zero is given to selection probe all the switches selects the first four input, so first four is produced as outputs and then when logical one is given to selection bit all the switches selects second set of four inputs. So the remaining four inputs are displayed as output. By giving selection input as zero and one we get all eight inputs as two set of four outputs.

Opto-coupler

This is worn by the user inside the mouth. When the multiplexer circuit is connected to the computer via parallel port, there is a possibility of electrocution which will be more fatal. In order to avoid this situation an opto-coupler is used which in turn provides an electrical isolation. The outputs from multiplexer and computer is connected to the opto-coupler, which senses the voltage change and transforms the data in the form of light and then converts this change of light in to electrical signal. By this way there is no electrical contact between the two ends.
Parallel port

The parallel port is used for sending data between the computer and multiplexer circuit. In multiplexer there are 4 inputs and 1 independent input, totally 5 inputs. These 5 inputs are connected with the pin number 10, 11, 12, 13 and 15. Here the pin 15 is inverted i.e. if input is given then 0 is displayed on the screen. XOR logic is used to correct the data. The pin 2, 3, 4 and 5 is used to send data from computer to multiplexer for the scanning purpose. The parallel port with the pin details are shown in the figure 6.

![Figure 6. Parallel port connection diagrams](image)

Mapping

247 phones are stored in the computer as data. The 247 phones are simplified in to 8 phones are mapped accordingly. Based on the users tongue and mouth movements the phones are pronounced by the computer via speaker\(^5\). The flow chart decision making is shown in the figure 7.

![Figure 7. Flow chart of software part](image)

Results

The entire work was aimed to sound as natural as possible\(^6\). But the actual result obtained was successful in pronouncing the individual letters correctly. As a test while pronouncing different words, some letters got repeated and some letters were missed. This was due to the difference in time taken for actual pronunciation and the time fixed in the algorithm. These errors can be corrected by the usage of effective algorithm and the usage of many more fusion laws in order to avoid the repetitions of letters.

![Figure 8. Picture of complete setup](image)

Software used

Matrix laboratory is used to develop algorithm for the fusion of 8 phones in order to make all the 247 phones by using fusion law given by NANNIOOL. The data is transferred between the computer and the device via parallel port and is programmed by using Matlab software.

Discussion

Using some advanced devices for tongue, lip movement and air flow detections, results can be improved. Using microcontroller and wireless devices the work can be made compatible and suitable for real time use. If this work is improved and made suitable for real time usage many gets benefited and an improved quality of life can be provided to the dumb people. In this work, the mapping table was done only for Tamil language. The mapping table can also be created for the other languages using their grammar and fusion laws. Usage of wireless devices, microcontroller and effective algorithm can make the work more effective.

Conclusion

In this work the movement of tongue; lips were identified by using ceramic hard palate and detection circuit. The data’s were transferred to the computer via multiplexer circuit and parallel port. The air flow was detected using the mike. Tamil phones were recorded, edited, and stored. The mapping table was created. As a final result the entire device was fixed and tested. As a test many letters and phrases were individually
pronounced without making any sound. The computer pronounced the letters and phrases correctly via speaker. The work can be extended, by making use of improved algorithms, microcontroller and the wireless device, in order to make it compatible for real time use.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Comparative Analysis of Automated Applications using Fetal Ultrasound Images

Bahbibi Rahmatullah

National Child Development Research Centre (NCDRC), Universiti Pendidikan Sultan Idris, 35900 Perak, Malaysia

Abstract

Computer-assisted technology plays an important role in helping to reduce risk during pregnancy, particularly serious risks associated with intra-uterine growth restriction (IUGR). Fetal gestational age estimation and fetal weight estimation are two crucial factors in evaluating fetal growth and detecting any abnormality of growth, in order to identify IUGR risk to the fetus. The estimation is made through serial measurement of fetal anatomy comprising the length, diameter and circumference of multiple segments in the fetus scanned through an ultrasound machine. The computing method helps to overcome human subjectivity in assessment that is prone to variability in measurement. Automatic measurement methods carried out by the computer can help in producing fast, accurate and reproducible measurement and assessment of the fetal anatomy. This study presents an analysis of techniques attempted by researchers in conducting automated fetal biometric anatomy measurements using ultrasound images. Chronological comparative analysis presented in this paper will aid other researchers who are keen to explore on computer-assisted technology especially in the field of fetal ultrasound imaging.

Keywords: Computer technology; fetal ultrasound; automatic method.

Introduction

Historically, X-ray was used to measure fetal dimensions (e.g. fetal head, pelvic dimension) (Shenton21) before the development of ultrasound. The development of two-dimensional (2D) ultrasound made the measurement of fetus soft tissue structures and bones faster and more reliable than with X-rays. 2D ultrasound is currently considered to be the first choice for a safe, non-invasive, accurate and cost-effective investigation in the fetus. In obstetrics care, it has gradually become a crucial apparatus and plays a significant role in the care of every pregnant mother.

The need to visualize structures or anatomical regions that are difficult to see with normal 2D ultrasound opened the path for three-dimensional (3D) ultrasound to be applied in obstetric care. Improvements in ultrasound transducer, display technique, reconstruction algorithms, and computer power account for 3D ultrasound being seriously considered for everyday clinical use. Diagnosis of fetal abnormalities such as cleft lip is improved with the accurate surface rendering capability in 3D ultrasound (Pretorius and Nelson13). Recent studies have shown that the use of 3D ultrasound results in accurate assessment of the fetal biometry (Mercé et al.9, Chan et al.5) and structural volumes (Moeglin et al.10, Chang et al.6). Another advantage is shorter patient examination times where 3D volumes data can be stored on a computer and repeatedly examined off line without continual scanning.

Problem Statement

Although ultrasound imaging has several advantages over other image modalities like MRI and CT, it suffers from many problems. For example, ultrasound suffers from acoustic shadowing, attenuation, motion effects and speckle. In addition, anatomical definition is poor when compared with MRI or CT. Due to this, some organs are very hard to be visualized and others cannot be seen. Moreover, the quality of the acquired
images highly depends on the sonographer experience. Acquisition reproducibility is a major problem in ultrasound imaging in which intra or inter-sonographer acquisition may highly affect the quality and the details in the acquired images. The problem becomes harder when using ultrasound for imaging fetuses because of the movement of the fetus and differences in maternal fat thickness and volume of amniotic acid. Figure 1 shows a screen shot of the femur bone for a 34 weeks fetus. The figure also reveals some challenges in ultrasound images such as like poor anatomical definition, shadowing from the bottom part of the femur, loss of signal at the two epiphysis ends and low signal to noise ratio. On the other hand, ultrasound imaging is real-time, less expensive and radiation free, which makes it the main choice in imaging modality in pregnancy care.

Figure 1. Ultrasound image of the fetal femur. The white linear segment within the thigh tissues represents the femur

SEARCH METHODOLOGY

Relatively, there has been fewer efforts at automating the analysis of fetal ultrasound images in comparison to other fields in medical ultrasound such as diagnostic cardiac ultrasound, breast ultrasound etc. The SCOPUS database (www.scopus.com) is used to find studies involving automation in fetal examinations with ultrasound devices. Table 1 shows chronological arrangements for studies related to the automation method in the measurement of the fetal biometric structure selected to be analyzed.

Table 1. Summary of research in 2D fetal ultrasound image analysis in chronological order

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>ROI</th>
<th>Dataset</th>
<th>Techniques</th>
<th>Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Zador et al.)</td>
<td>Head</td>
<td>75 images (from frozen video)</td>
<td>Threshold - Edge detection (gradient operator) - Hough transform</td>
<td>BPD ($r = 0.986, 1.87\pm1.94$ mm) OFD ($r = 0.958, 2.82\pm4.13$ mm) HC ($r = 0.972, -0.36\pm9.87$ mm) 8 sec on 10 MHz IBM</td>
</tr>
<tr>
<td>(Chalana et al.) and Pathak et al.)</td>
<td>Head</td>
<td>35 images</td>
<td>Active contour model Specify initial points - Pre-processing – Cubic spline fitting - Active contour algorithm</td>
<td>BPD ($r = 0.99,</td>
</tr>
</tbody>
</table>
(Lu et al.\textsuperscript{8}) \quad \text{Head} \quad 217 \text{ images} \quad \text{K-means classifier and Iterative Randomized Hough transform (IRHT)} \quad \text{BPD (r = 0.997, 0.12\%)} \\

\text{HC (r = 0.993, -0.52\%)} \\
1.6 \text{ s on 1987-MHz Athlon}

(Rahmatullah et al.\textsuperscript{14, 15}) \quad \text{Femur} \quad 200 \text{ images} \quad \text{The watershed method is combined with femur bone extraction algorithm and threshold method using 12x12 block} \quad \text{The average difference d, -7.73 and 7.72 pixels below and above the expert’s measurement for trimester 2, and d, -8.63 and 8.25 pixels images below and above the expert’s measurement for trimester 3 fetal image. Fastest time is 31.12 sec}

(Carneiro et al.\textsuperscript{1}, Carneiro et al.\textsuperscript{3}) \quad \text{Head, Femur, Abdomen, Body, Humerus} \quad \text{Training (1426 head, 1168 femur, 1293 abdomen, 547 humerus, 325 body), Testing (30 for each structure)} \quad \text{Constrained probabilistic boosting tree (CPBT)} \quad \text{Average measurement from 15 experts as gold standard. 0.5 sec on dual-core PC Other quantitative measurement – see reference}

(Rahmatullah et al.\textsuperscript{16, 17, 18, 19}) \quad \text{Abdomen (stomach bubble (SB) & umbilical vein (UV) objects)} \quad \text{Training (SB: 633 positive, 2073 negative. UV 224 positive, 851 negative). Validation (50 positive, 50 negative per object). Testing (2283 positive and 100 negative per object)} \quad \text{AdaBoost classifier and hybrid coupled local phase features} \quad \text{Stomach bubble (SB): AUC (0.88), Accuracy (82.75\%), Sensitivity (66.49\%)} \\
\text{Umbilical vein (UV): AUC (0.75), Accuracy (72.55\%), Sensitivity (57.09\%) Average time less than 1 second.}

(Konur\textsuperscript{7}) \quad \text{Head} \quad \text{Training (274 healthy, 24 defective), Testing (55 healthy, 5 defective)} \quad \text{Rotational invariance of magnitudes of Zernike moments as features in Support Vector Machine (SVM) classification} \quad \text{Average values of 0.6276 F-measure and 0.6306 GMRP with 94\% accuracy and 98\% specificity.}

Morphological operators had been the basis for many of the initial approaches for automatic segmentation in fetal ultrasound images (Zador et al.\textsuperscript{23}, Lu et al.\textsuperscript{8}). A sequence of phases were used in order to perform femur and head segmentation including edge linking, Hough transform and edge detection. Active contour model was employed by Chalana et al.\textsuperscript{4} and Pathak et al.\textsuperscript{12} for fetal head and abdomen segmentation. Active contour method has its disadvantages and among them is that it might require manual correction when it get stuck at local minima.

The initial methods used for femur segmentation have been refined and improved through the watershed method experimented by Rahmatullah et al.\textsuperscript{14, 15}. This method combines the use of femur extraction algorithm and threshold method. Results obtained through this method demonstrate an increase in performance and a faster computational time for the segmentation and measurement of femur bones.
A database-guided segmentation technique for the detection and measurement of head, femur and abdominal structures were proposed by Carneiro et al.\textsuperscript{1,2} that utilized the discriminative constrained probabilistic boosting tree (PBT) classifier. Adaboost were used to train the strong classifiers at the nodes of the binary tree. The method was extended to measure the crown-rump length (CRL) and also the humerus length (HL).

Rahmatullah et al.\textsuperscript{16,18,19} conducted experiments for the detection of objects such as the abdominal and umbilical veins found in the abdominal image. Large databases that contain positive images and negative images for both objects are used to train AdaBoost classifier to detect both objects more accurately. This method is enhanced by the use of local phase features that are combined hybrid with the classifier.

Rahmatullah et al.\textsuperscript{16} attempted an automated anatomical structure detection as the first step towards the development of a fast and reproducible assessment of fetal biometry scan. Quantitative and qualitative evaluations of all the algorithms were obtained using 2384 images of fetal abdominal scans retrieved from the INTERGROWTH-21st project image database study (Rahmatullah et al.\textsuperscript{18}). The proposed “hybrid” detection method was evaluated in two potential application scenarios. The first application was clinical scoring in which both the computer algorithm and four experts were asked to record occurrence or nonappearance of the stomach and the umbilical vein in 400 ultrasound images (Rahmatullah et al.\textsuperscript{19}). The second application concerned selecting the standard image plane from 3D abdominal ultrasound volume (Rahmatullah et al.\textsuperscript{17}).

A computer aided detection system was proposed by Konur\textsuperscript{7} for detecting the neural tube defect of spina bifida because currently manual segmentations has been the ground truth in its implementation. Magnitudes of Zernike moments utilized in the system were computed from the normalized skull shapes acquired in ultrasound scan. At a sampling rate of synthetic minority oversampling technique (SMOTE) of 400% followed by 50% random undersampling (RU), the test result achieved an accuracy of 94% and 98% in specificity.

<table>
<thead>
<tr>
<th>Author, Year</th>
<th>ROI</th>
<th>Dataset</th>
<th>Techniques</th>
<th>Validation</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Ultrasound</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Nguyen et al.\textsuperscript{11})</td>
<td>Whole fetus</td>
<td>Training (400 fetus) 40 volume datasets</td>
<td>Support vector machine (SVM) texture classification</td>
<td>Qualitative</td>
</tr>
<tr>
<td>(Carneiro et al.\textsuperscript{2})</td>
<td>Fetal head</td>
<td>200 volumes from 13-35 weeks fetuses</td>
<td>Probabilistic boosting tree (PBT) algorithm</td>
<td>Error similar to inter-user variability. Performs under 10 sec on dual-core PC 1.7 GHz</td>
</tr>
<tr>
<td>(Rueda et al., \textsuperscript{20})</td>
<td>Fetal arm</td>
<td>7 volumes from 21-40 weeks fetuses</td>
<td>Fuzzy connectedness with affinity function using local phase and feature asymmetry</td>
<td>Precision 93.51±1.91% Recall 82.77±5.74% Dice similarity 87.69±3.05%</td>
</tr>
<tr>
<td>(Yang et al.\textsuperscript{22})</td>
<td>Fetus, gestational sac and placenta</td>
<td>104 volumes from 10 to 14 weeks fetuses (50 training, 10 validation and 44 testing)</td>
<td>3D fully convolutional network (FCN) enhanced with transfer learning and deep supervision with adapted recurrent neural network (RNN)</td>
<td>r = 0.938 and Bland Altman agreement = -0.14±13 mL when compared to experts.</td>
</tr>
</tbody>
</table>
There have been fewer related works in fetal 3D ultrasound. Automatic extraction of the frontal surface of a fetus from a 3D fetal ultrasound volume were the focus in Nguyen et al.\(^\text{11}\) where the texture classification method proposed used a support vector machine (SVM). Improvement in the visualization of the fetus frontal surface were evident in the results and achieved through the removal of some amount of abdominal fluids and walls.

Carneiro et al.\(^\text{2}\) extended their probabilistic boosting tree method to finding anatomies in 3D ultrasound volume of fetal head based on semantic keywords. The method presented in this work would let the user to decide the selection of anatomical landmarks (i.e. cistern magna, cerebellum) in fetal brain and not based on any pre-defined clinical protocol.

Rueda et al.\(^\text{20}\) investigated the problem of segmenting the adipose tissue on the fetal arm which is proposed as a fetal nutrition indicator. Fuzzy connectedness framework was the basis in their segmentation approach which utilized an affinity function using edge and structural information acquired from local phase features extraction. Quantitative and qualitative results obtained indicates the superiority of the method compared to the framework that was based on intensity images only.

A fully automated semantic segmentation of fetus, placenta and gestational sac in 3D ultrasound volumes was developed by Yang et al.\(^\text{22}\). To address the challenge presented by variations in image quality, shape and scale, they utilized a 3D fully convolutional network (FCN) that are embedded with deep supervision and transfer learning. RNN was adapted as a common module to encode varying contextual dependency in order to balance the spatial concurrency exploited in 3D FCN. They performed extensive validation of their proposed method by comparing it with other methods. Encouraging quantitative results were accomplished (0.64 in Dice for placenta and 0.9 for gestational sac and fetus) and they presented qualitative results through their large datasets.

**Conclusion**

The outcome of the literature search and comparison in the field of fetal image ultrasound analysis indicates that researchers had been mostly focused and limited to the area of (semi)-automated segmentation of particular fetal anatomical structure for producing biometric measurement that is of high accuracy. The poor quality of ultrasound image has been recognized by all the papers as the major hurdles in their algorithms implementation.

The extensive manipulation needed to be performed by the clinician in finding the standard planes to assess the fetal biometric measurement in a 3D ultrasound remains to be the main challenge for promoting the widespread use of the volumetric ultrasound. The learning curve to understand the manipulation steps is quite large even for an expert user (Mercé et al.\(^\text{9}\)). Therefore, standardized planes localization scheme would be of tremendous benefit in progressing the application and usage of 3D ultrasound for clinical diagnosis.

**Acknowledgement:** The author would like to thank organizer of TWAS-UNESCO Joint Research Grants for funding the research and Sultan Idris Education University as the organizing institution.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

5. Chan LW, Fung TY, Leung TY, Sahota DS, Lau TK. Volumetric (3D) imaging reduces inter- and intra-


An Analysis on Social Support and Community Commitment in the Investigation of New Cases of Smear Positive Pulmonary TB in the Work Area of Donggala Health Centre, Donggala Regency, Central Sulawesi

Miradiantri Tule¹, Muh. Syafar¹, Alimin Maidin¹

¹Faculty of Public Health, Hasanuddin University, Jl. PerintisKemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

The study aim was to analyze social support and community commitment in the investigation of new cases of smear positive pulmonary tuberculosis in the work area of community health center (Puskesmas) of Donggala. This study was used qualitative method with phenomenological approach. The informants were those who recovered from pulmonary tuberculosis patients and who were had pulmonary tuberculosis disease treatment, health workers and community. The data were analyzed with content analysis done through some steps such data collection, data reduction/ethic data, data presentation, drawing conclusion/concept. The study was indicated that social support in investigation of new cases of smear positive pulmonary tuberculosis came from family such as transportation, cost, and motivation to access the health facilities from health workers and community: information on pulmonary tuberculosis and motivation for medical treatment to facilities of health service. The commitment in investigation of new cases of smear positive pulmonary tuberculosis such as community agreement to form community caring pulmonary tuberculosis in work area of Donggala health center supported from district government.

Keywords: Community commitment; Pulmonary tuberculosis; Social support

Introduction

The pulmonary tuberculosis is infectious disease caused by mycobacterium tuberculosis and main health problem in global and Indonesia especially poor community¹. The bacteria are transmitted through mouth or nose and through respiratory system². India, Indonesia and China had high pulmonary tuberculosis cases³. There is an estimated 1 million of new pulmonary tuberculosis per year in Indonesia¹. Based on Millennium Development Goal (MDGs), efforts in disease prevention included tuberculosis that indicated to increase Human Development Index (HDI) based on tuberculosis with high incidence rates and fluctuate each year⁴. The pulmonary tuberculosis had disadvantage effect such as stigma and even ignored by the community⁵.

Based on Indonesia Health Profile in 2014, new positive pulmonary tuberculosis cases in Central Sulawesi province reached 40%. This result showed MDG target had not reached 70%². Donggala regency had recorded low positive pulmonary tuberculosis cases was 43%. The health profile data within 4 years showed new positive pulmonary tuberculosis cases which ranged 41% to 43%.

The social support is important and made individual felt calm, confident, competent, and loved⁶-⁹. The social support was important for chronic disease patients such pulmonary tuberculosis diseases because support affected individual behavior such as reduced anxiety, helpless, and hopeless that improved health status¹⁰. The community participation and health worker influenced and communication helped in pulmonary tuberculosis cases in Cambodia⁷. The villages with high community participation and health worker influenced and communication helped in pulmonary tuberculosis cases in Cambodia⁷. The villages with high community participation and health worker influenced and communication helped in pulmonary tuberculosis cases in Cambodia⁷. The villages with high community participation and health worker influenced and communication helped in pulmonary tuberculosis cases in Cambodia⁷. The villages with high community participation and health worker influenced and communication helped in pulmonary tuberculosis cases in Cambodia⁷.
participation that exceed case detection rate (CDR) target ≥ 70%, 7.5 times greater than in villages with low community participation\textsuperscript{11}. The community perception on pulmonary tuberculosis was due to offspring and cursed\textsuperscript{12}. The study aim was to analyze social support and community commitment in the investigation of new cases of smear positive pulmonary tuberculosis in the work area of Donggala health centre.

**Methodology**

**Study Type**

The study is used qualitative research design with phenomenology approach. This study design was used to analyze social support and community commitment in new smear positive pulmonary tuberculosis cases discovery in the work area of Donggala community health center of Donggala regency, Central Sulawesi province.

**Location and Time**

The study was carried out from March to May 2016 in the work area of community health center (Puskesmas) of Donggala regency, Central Sulawesi province since PuskesmasDonggala had found new cases that program target (≥70%).

**Population and Sample**

The respondent determination method used was purposive sampling method. The sampling criteria in this study included:

a) Smear positive pulmonary TB patients: The new smear positive pulmonary TB patient were informants in this study which is diagnosis by health workers and undergone treatment. The patients provide information about their experience such as initial symptom of pulmonary TB, accessibility to health facilities and treatment.

b) Community: The regional leaders, community leaders and people who are influential in the work area of PuskesmasDonggala.

c) Health officer: The head of DonggalaPuskesmas, manager of PuskesmasDonggala, midwives and health officer of community health service program.

**Data Collection**

The primary data was obtained was conducted observation, in-depth interview and focus group discussion (FGD). Meanwhile, the secondary data was obtained from health office of Central Sulawesi province, Donggala health office and PuskesmasDonggala.

**Data Processing and Data Analysis**

The data were analyzed with content analysis done through some steps such data collection, data reduction/ethic data, data presentation, drawing conclusion/concept.

**Result and Discussion**

**Result**

Table 1 shows the informant’s answer toward pulmonary tuberculosis. Based on this study, understanding toward tuberculosis symptom was long term cough, body weight loss, sleepless and sweat on night time and fatigue. The risk factor of pulmonary TB was due to bacteria, smoking habit and job risk as factory workers. Most of informants understood pulmonary TB was spread through cough. Besides, some of informants did not understand about pulmonary TB transmission. The pulmonary TB required 6 months treatment and some of informant had repeated treatment. In general, informant understood tuberculosis disease prevention effort from separated the cutlery, maintained house cleanliness, good air circulation, lighting and keep body’s stamina to be always fit. The community was still interacted with tuberculosis patients since no prohibition among healthy person with pulmonary TB patients. The perception toward pulmonary TB was common cough, no longer as curse disease and transmitted through infected person to healthy person. All informants had positive response toward effort made by health worker in the control of tuberculosis pulmonary. The availability of health care facilities in the village area was easy for villagers to get access on health service. The informants had received moral support from families and community in form of informational, tangible and emotional support.
Table 1. Informant’s answer toward pulmonary tuberculosis

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Understanding toward the tuberculosis symptom</td>
<td>Most of informants found initial tuberculosis symptom were continuously cough, sleepless and sweat on night time, weight loss and fatigue.</td>
</tr>
<tr>
<td>2.</td>
<td>Understanding toward risk factor of tuberculosis disease</td>
<td>The risk factor was due to bacteria, job risk and smoking habit.</td>
</tr>
<tr>
<td>3.</td>
<td>Understanding the tuberculosis spreading in the environment</td>
<td>Most of informants never know risk factor of tuberculosis disease after informed by health worker.</td>
</tr>
<tr>
<td>4.</td>
<td>Understanding toward the tuberculosis treatment</td>
<td>The cough medicine was preferred before undergoing 6 months and repeated treatment.</td>
</tr>
<tr>
<td>5.</td>
<td>Understand about tuberculosis disease effort</td>
<td>The effort to prevent pulmonary TB was suspended due to lack of awareness among patient. The house hygiene, good in air circulation and lighting were effort in pulmonary TB prevention.</td>
</tr>
<tr>
<td>6.</td>
<td>The community attitude toward tuberculosis disease</td>
<td>The community still has good relationship with pulmonary TB patient since no any prohibition to keep away from pulmonary TB patients.</td>
</tr>
<tr>
<td>7.</td>
<td>The community perception toward tuberculosis disease</td>
<td>The community perception toward pulmonary TB was common cough diseases and concerned to contact with pulmonary TB patients.</td>
</tr>
<tr>
<td>8.</td>
<td>The community beliefs toward tuberculosis disease</td>
<td>The pulmonary TB disease was infection disease due to germs.</td>
</tr>
<tr>
<td>9.</td>
<td>Health worker role in the pulmonary tuberculosis cases</td>
<td>The health workers were good person that given information and midwives also encouraged to seek treatment at Puskesmas.</td>
</tr>
<tr>
<td>10.</td>
<td>Availability and accessibility of health care facilities</td>
<td>There was no village health post (Poskesdas) in their village. The villagers had easily access to Puskesmas location by public transportation.</td>
</tr>
<tr>
<td>11.</td>
<td>Social support from community in pulmonary tuberculosis</td>
<td>The pulmonary TB patients received moral support from their family in form of tangible and emotional support.</td>
</tr>
</tbody>
</table>

Source: Primary data

Table 2 illustrates the health worker and community leader’s answer toward pulmonary tuberculosis. The community participation was improved from year by year in support pulmonary tuberculosis cases since community understood pulmonary tuberculosis was cured with proper treatment. The availability and accessibility of health service facilities in Pustu, Poskesdas and PuskesmasDonggala is sufficient for villages and easily access by public transportation. The informant made supportive effort in pulmonary tuberculosis cases as well as efforts to support pulmonary tuberculosis findings such as cross-sector cooperation and program, performed supervision on program, logistic management and treatment included budget policies for program. The commitment from each sub-district on PuskesmasDonggala was important in pulmonary tuberculosis disease prevention.
Table 2. The health worker and community leader’s answer on pulmonary tuberculosis

<table>
<thead>
<tr>
<th>No</th>
<th>Variable</th>
<th>Informant’s answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The community participation in pulmonary tuberculosis disease</td>
<td>The pulmonary TB was no longer taboo in community. Most of community understood pulmonary tuberculosis could be cure by good treatment. The community participation was increased year by year in support on pulmonary disease cases.</td>
</tr>
<tr>
<td>2</td>
<td>Availability and accessibility of health care facilities</td>
<td>Most of villages had auxiliary public health center (Pustu) or Poskesdas. The community had easily access health care facilities by public transportation.</td>
</tr>
<tr>
<td>3</td>
<td>Efforts in support new pulmonary TB discovery</td>
<td>The pulmonary TB examination was provided in the village. The counseling was given to new pulmonary TB patients and their families.</td>
</tr>
<tr>
<td>4</td>
<td>Commitment on support effort in pulmonary tuberculosis disease</td>
<td>The local government had supported all health program undergone in district. In additions, good communication and collaboration between community leaders and midwives.</td>
</tr>
</tbody>
</table>

Source: Primary data

Overall Discussion

Based on this study, the informants understood early pulmonary tuberculosis symptoms are continuously cough up blood, weight loss, and night sweats. The understanding in pulmonary tuberculosis disease is varies among the informants. Most of informant had stated pulmonary tuberculosis is caused by smoking habits and their work duty in coconut factory and construction area. The education was among factor influenced informant’s understanding toward this disease was education level. Based on focus group discussion, informant had mentioned pulmonary tuberculosis disease is due to bacteria. The informant understood pulmonary tuberculosis transmission because informant had obtained information from the health worker or mass media. The new information provided cognitive foundation formed new knowledge.

The informant understood pulmonary tuberculosis disease treatment is 6 months. Before treatment, informant had consumed cough medicine bought from pharmacy. In this study, informant tend to have late treatment because their late awareness on early pulmonary tuberculosis. Most of informants are examined their illness after suffered continuously cough for a month or two months. The lack of awareness among patients on symptom and late visit to health center is referred as patient delay. Most delay occur in first step represented decision to seek help and through interaction with non-pulmonary tuberculosis health care staff. The program was introduced to strengthen their understanding and health examination regulation on pulmonary tuberculosis diagnosis.

Besides, informant understood effort in this disease prevention. The house cleanliness, good air circulation and maintained body stamina was best way to avoid from this disease. The pulmonary tuberculosis is due to mycobacterium tuberculosis very sensitive to heat, sunlight and ultraviolet light. Most germs were died after direct exposure with sunlight within few minutes. The focus group discussion concluded community understanding in PuskesmasDonggala toward pulmonary tuberculosis which transmitted disease from suspected to health person due to bacteria especially in crowded area. The pulmonary tuberculosis symptom commonly was cough more than 1 month, body weakness, vomiting blood and chest pain. The pulmonary tuberculosis patient was given 6 months treatment. This disease was prevented by maintained house hygiene.

The informant showed positive attitude toward the pulmonary tuberculosis disease and still interacted with pulmonary tuberculosis patients. The informant understood pulmonary tuberculosis (TB) was a contagious disease since no stigmatization about this disease. The pulmonary tuberculosis patient was stated still interacted as usual with healthy person. The community was stated interaction was usual with...
pulmonary tuberculosis patients and still maintained family relationship between them. The social interaction included relationship between individual with physical and surrounding psychological environment. There were small people who still antipathy toward pulmonary tuberculosis patient. The positive attitude toward pulmonary tuberculosis disease had influenced community participation in pulmonary tuberculosis discovery. The people had encouraged to visit the health centre if initial symptom was detected.

Based on Focus Group Discussion showed community was still interacted with the pulmonary tuberculosis patient. The study also showed that the personal attitude and behavior toward pulmonary tuberculosis disease was much influenced prevention successful. The understanding and knowledge in patient, family, community and health workers also played important role in treatment performance. The person suspected suffered pulmonary tuberculosis disease needed immediate treatment to avoid the disease transmission.

The study showed informant perception toward pulmonary tuberculosis disease was common cough disease based on symptom. The informant went to seek treatment at health center once symptom was persisted for long time. Besides, informant was assumed this disease was not curse disease. The pulmonary tuberculosis patients are still interacted with healthy person because still has family relationship. Based on focus group discussion, pulmonary tuberculosis patients were not offended by the community and need to be support. The treatment and prevention step were needed by maintained house cleanliness and body stamina. In west Lombok, community stigma was still strong and assumed embarrassed as pulmonary tuberculosis patients.

The community beliefs toward pulmonary tuberculosis disease affected attitude in seek treatment for pulmonary tuberculosis. In this study, informant believed this disease was not curse disease, but infectious disease caused by bacteria. There was belief that this disease transmitted between healthy people with patients. The informant said there was no transmission between them and children suffered pulmonary tuberculosis disease. The belief was a manifestation with various perceptions that developed in human thinking. The community had believed on pulmonary tuberculosis was a contagious disease cured if treated properly. Besides, community believed that this disease was curse disease caused by evil spirits.

Based on this study, there was good coordination between health worker in PuskesmasDonggala and health worker in other Puskesmas in effort for pulmonary tuberculosis cases. The examination record was reported had highest cases discovery in Puskesmas. The health program was conducted and well implemented in the village where program officers from Puskesmas were also actively implemented health program. The home visit by the health worker was found some pulmonary tuberculosis cases. The experience in work was contributed positive influence on work performance. Besides, the informant worked better because their experience and characteristic of the working area of PuskesmasDonggala. The improvements in health program and health service mobilization were needed to increase the new cases discovery. The promotion on the health program was needed in the community so more participation and cooperation for new pulmonary tuberculosis disease discovery in the community. The good coordination between the informant and health program officers at Puskesmas was well established. Based on Focus Group discussion, the health worker role in pulmonary tuberculosis cases was quite good but still needed improvement for future. The program implementation was needed competency person to achieve the program objectives.

The health facilities availability such as wheelchair was available in the health center Donggala. Most of work area of PuskesmasDonggala had Poskesdes or Puskesmas building in each village. There were only four villages that did not have health service facilities. In Cambodia, availability of health facilities and severity of disease was determinant in search for health care. The health care facilities were utilized by community if health workers were on duty. Besides, there were health worker also in charge at the Puskesmas and Poskesdes. Head of PuskesmasDonggala also mentioned village did not have Puskesmas but still had midwives on duty for villagers. There were total 22 midwives served in the village in the work area of PuskesmasDonggala. The accessibility to health service facilities either Puskesmas or Poskesdes easily access by community and transportation. However, there were midwives served in the village. PuskesmasDonggala was one of microscopic referral Puskesmas in Donggala district. The focus
group discussion had been done on community showed that availability on midwives in the village especially villages that did not have Puskesmas or Poskesdes. The women had high risk in pulmonary tuberculosis disease since no accessibility on health facilities in Ethiopia\textsuperscript{18}.

Based on this study, informant had revealed there was social support from families, health workers and neighbors. The family member was important in pulmonary tuberculosis patients especially their financial support\textsuperscript{8}. The supports were in form of information, motivation and transportation. There was relationship between social support and life quality in pulmonary tuberculosis patients\textsuperscript{19}. The focus group discussion showed community support was important toward pulmonary tuberculosis patient. Besides, support from community toward health worker in health program for 6 months treatment. The social support was one function in social ties that positively related to health\textsuperscript{6}. The participation of district government in health program was very supportive in handled pulmonary tuberculosis disease in the work area of PuskesmasDonggala.

The commitments in this case were from sub-district leadership and community commitment. The health worker found that number of disease cases in Banawa sub-district was higher than in Central Banawa district. The factor related with case detection rate (CDR) included identifying need, mobilizing program resources and leadership\textsuperscript{10}. The focus group discussion showed there was community commitment in pulmonary tuberculosis cases in the working area of PuskesmasDonggala. The commitment was an agreement to establish pulmonary tuberculosis care community in the work area of PuskesmasDonggala.

**Conclusion**

In conclusions, community had good understanding about pulmonary tuberculosis disease and symptom, causes, transmission, treatment and efforts to prevent pulmonary tuberculosis disease. Besides, there was positive attitude among community about pulmonary tuberculosis disease. The community was still interacted with pulmonary tuberculosis patient as usual. The perceptions in pulmonary tuberculosis were infectious disease which cured with completed 6 months. There was no longer belief in community that this disease was cursed disease. The health worker had good role in this pulmonary tuberculosis cases discovery. The availability and accessibility of health facilities in work area of PuskesmasDonggala was good. Most of village had Pustu and Poskesdes in work area of PuskesmasDonggala. PuskesmasDonggala was microscopic referral clinic equipped with laboratory that supported pulmonary tuberculosis disease examination. The social support was coming from families, health worker and community. The social support was in form of instrumental, informational and emotional support.

**Acknowledgment:** The author would like to acknowledge the participants from work area of PuskesmasDonggala as well as Faculty of Public Health, Hasanuddin University for unconditionally support.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


6. Golub JE, Mohan CI, Comstock GW, Chaisson RE. Active case finding of tuberculosis; historical perspective and future prospect. The International


17. Maryun Y. Some of the factors that are associated with the performance of the TB program have been included in the establishment of new BTA (+) in Tasikmalayat in 2006 (Master's Thesis). Diponegoro University. 2007.


Healthy Life Pattern Behind Related To the Movement Program First 1000 Days of Life in Gowa Regency of South Sulawesi Province

Muh Zaifullah¹, Ridwan M. Thaha¹, Suriah¹
¹Faculty of Public Health, Hasanuddin University, Jl. Perintis Kemerdekaan Km. 10, Tamalanrea Indah, Tamalanrea, Kota Makassar, Sulawesi Selatan 90245, Indonesia

Abstract

This study aims to analyse in depth the healthy lifestyle of pregnant women related to the movement of the first 1000 days of life in Gowa Regency of South Sulawesi Province. The method used in this work is qualitative method with phenomenology design. Determination of informants was done using purposive sampling method and 17 informants were obtained. Data were collected through depth interview and observation. Data analysis was done using content analysis and presented in narrative form. The results showed that the frequency of feeding that the mother applied during pregnancy varies, ranging from 5 times to only 1 time per day. Several types of dietary restrictions according to informants are pineapple, mango, squid, shrimp, crab, and moringa leaves. Physical activity carried out such as washing, sweeping and other household chores. Meanwhile, the form of personal hygiene during pregnancy is showering, shampooing, and brushing teeth. Informants stated that they had health information from books and maternity class. Informants stated that they have used ANC services supported by the role of health workers in providing service fulfilment strategies. In addition, the informant was assisted by midwives and doctors during labor period. There some informants continued to have neonatal and low baby weight (LBW) neonatal deaths despite receiving the ANC services. Therefore, one of the obstacles to the movement’s first 1000 days of life is the practise of healthy lifestyle of mother during pregnancy.

Keywords: Healthy Life Pattern; Movement Program; Pregnant women

Introduction

Pregnant women, nursing mothers, new-borns and children under the age of two years are the target group to improve the quality of life through the First 1000 Days of Life program. This program is a thousand-day period from the time of conception to a two-year-old child. A thousand days consists of 270 days during pregnancy and 730 days of first life since the baby is born. This period is called the golden period or also called a critical time, which if not properly utilized there will be permanent damage to the child or new-born.

Maternal and neonatal complications and deaths often occur during labor. Therefore, interventions that emphasize the safe delivery of help are provided by health personnel. This is to demonstrate the level of ability of the government in providing quality delivery services assisted by skilled health personnel including pregnancy examination, maternity delivery and delivery assistance. According to Yenita (2011) it is expected that every pregnant woman utilizes health workers like doctors, midwives and nurses in the delivery aid. By choosing a health worker as a maternity helper, the mother will receive health services in accordance with the principle of germ-free and standard procedure of care.

Nutrition problem is a public health problem, especially in pregnant women and is an important cause of maternal mortality and child mortality indirectly that actually can still be prevented. A good nutritional condition is a major prerequisite in realizing healthy

DOI Number: 10.5958/0976-5506.2019.00889.1
and qualified human resources. If traced, nutritional problems occur in every life cycle, beginning in the womb (fetus), infant, child, adult, and old age. Therefore, the occurrence of nutritional disorders in those days can be permanent and cannot be recovered even though nutritional needs in the future are met.

Pregnant women who exercise regularly experience less weight gain and less body fat than women who are less active. The weight keeps rising normally and the baby remains in excellent health. In addition, pregnancy and the birth process of active women will tend to be problematic. By exercising, the demands of pregnancy on the body and fulfilled well.

Antenatal Care (ANC) is an examination conducted by health officers to pregnant women and their fetus periodically to monitor the condition of maternal health and growth and development of the fetus in preparation for delivery. The purpose of ANC services is to optimally prepare physically and mentally the mother and child during pregnancy, childbirth and childbirth so as to get mother and son.

The Government of Indonesia’s commitment to resolve the issue has been declared through Government Regulation no. 42 of 2013 on the National Movement for the Acceleration of Nutrition Improvement and on 30 October 2013. The President of the Republic of Indonesia has launched the National Movement for the Acceleration of Nutrition Improvement in the First Thousand Day of Life (1000 HPK). The first thousand days of life is a golden period for a child to grow and develop optimally. Disorders occurring during this period, especially proper nutritional intake and healthy life behaviors of mothers during pregnancy will have an impact on survival and development of children that is permanent and long-term and more difficult to repair after 2-year-old child.

Gowa regency is one of the districts with high maternal and infant health problems. The maternal mortality rate in Gowa regency in 2013 is 10 cases, while the neonatal mortality rate is 72 cases. The case of neonatal death in Gowa Regency is the highest in South Sulawesi Province. Therefore, this study aims to analyse the healthy lifestyle of pregnant women related to movement program of first 1000 days of life (1000 HPK) in Gowa Regency.

Methodology

Design and Type of Research

The research method used in this research is qualitative research method. According to Sarwono (2006) qualitative research is a process that tries to gain a better understanding of the complexity that exists in human interaction. This study aims to determine the pattern of healthy behaviours of pregnant women against the program movement First 1000 Days of Life. The techniques used are observations and in-depth interviews.

Time and Place of Study

This research is located in Palangga sub-district working area of Palangga and Kampili health center of Gowa regency. The location of the study was chosen due to the prevalence of infant mortality, low nutrition and high low weight birth rate. The information to be extracted in this study is a healthy pattern of pregnant women against the program movement of the first thousand days of life.

Informant Determination Method

The method used in this research is purposive sampling that is sampling technique of data source with certain consideration. Certain considerations such as those who are considered most know about what we expect to facilitate researchers to explore the object / social situation under study. The informants in this study were mothers who had given birth, immediate family and local health personnel. Thus, Informants in this study were mothers who had given birth with nutritional problems; the mother’s family who gave birth to it, as well as health care workers in Kecamatan Palangga (working area of Puskesmas Palangga and Puskesmas Kampili). The number of informants interviewed was 17 people consisting of 11 maternal informants who had given birth with nutritional problems, 2 family informants, and 4 health worker informants.

Data Collection

Primary data is obtained by way of observation and in-depth interviews on pregnant women, families and health workers. Observations were made by researchers before and after in-depth interviews by observing the closest health facilities accessible to informants and handling of health services including the availability.
of health information supporting the healthy life-style of informants related to the first 1000 days of life program. In addition, triangulation technique is done by cross checking between information obtained by direct observation at research location and information from the in-depth interview.

Data Analysis

Data obtained from in-depth interviews are done manually in accordance with the instructions of qualitative data processing, as well as in accordance with the purpose of this study.

Result and Discussion

Balanced Diet during Pregnancy

Based on the results of in-depth interviews, informants recounted the frequency of eating done during pregnancy. The answers expressed by the informants vary, ranging from more than five times a day to only one meal per day, but the reasons for such behaviour vary, for example economic reasons, habits, and laziness. The informants who eat up to 5 times each day due to the feels of increased appetite during pregnancy. In addition, there are informants eating once per day due to laziness. In addition to the economic factors and influences of pregnancy, the informants explained that the frequency of eating during pregnancy was irregular and it depends on the condition and appetite at the time.

Regarding the healthy foods taken during pregnancy, informants said that the food menu consumed by mothers during pregnancy is rice, vegetables, fruit, fish and egg consumption is only done if the financial condition is sufficient. They would prefer chicken but limited by the financial condition. They do consume fruit if the garden season arrives.

Informants also explained that the type of food at risk that is often consumed is meatballs and sambal, although the type of food is not recommended by health workers. There are informants who love to consume the type of meatball food, instant noodles, and coto. However, they have refrained from consuming them as direct by the health workers as the food may cause hypertension. Some informants have abstinence foods during pregnancy such as pineapple, mango, durian, and certain beverages. Some informant’s prohibition are shrimp and squid which could lead to difficult labour process and the prospective baby will be born with a weak condition.

Maternal Physical Activity during Pregnancy

The type of activity performed during the pregnancy according to the informant was washing and walking. Another informant performs sweeping and lifting activities up to the time before delivery. The reason that many more pregnant women who do not do physical activity is the assumption that without exercising informants are still sweating. In addition, there are some informants who choose not to exercise for reasons of history of pregnancy disorders. Other informants also did not do much physical activity during pregnancy due to the availability of facilities such as washing machine and vehicle to move around. In addition, there are informants who do not engage in physical activity during pregnancy due to a sense of laziness.

Personal Hygiene during Pregnancy

Based on the results of in-depth interviews to informants, explained that the informant diligently perform self-hygiene such as brushing teeth and using shampoo bathing as much as 2 (two) times a day due to hot weather conditions. In contrast to other informants, there are informants who perform self-hygiene activities only once a day for cultural reasons adopted by her family.

Mother’s Role Model during Pregnancy

Informants revealed that informants do not have role models during pregnancy because the informant is the first child and live alone, so that if there is a complaint during pregnancy, the informant will go directly to the health service. In addition, some informant revealed that they selected their neighbour’s as role model due to experience and proximity in terms of distance. Some informant revealed not to follow the advice of role models because they may lack of experience in certain situation.

Resources during Pregnancy

Informants explained that the informants were easy in reaching the existing health facilities due to the close proximity of both the health centre and the village midwife. Besides that, the informants said that the presence of village midwives who opened 24 hours gives the opportunity for pregnant women to check their health at any time. The book of Mother and Child Health
(MCH) also provided to informants, but they have never read them.

**Antenatal Care (ANC) Compliance**

The informants routinely check the content even every month, so if there are complaints related to ANC content, the informant directly goes to health facilities. The other informants also provided the view that their pregnancy check-up routinely and always hear the directions from health workers. The informant also said that ever get vitamins and formula milk.

**Birth Support**

Informants explained that the childbirth performed by midwives in health centre. Other informants stated that her childbirth was helped by medical personnel such as doctors at the hospital through a caesarean process.

**Overall Discussion**

A good diet for pregnant women should meet the source of carbohydrates, proteins and fats as well as vitamins and minerals. For the sake of the success of pregnancy, the mother’s nutritional state at the time of conception must be in good condition and during pregnancy should get additional protein, minerals, vitamins and energy. While Hardinsyah and Briawan (2005) explain when the body lack of nutrients, especially energy and protein in the early stages cause hunger and within a certain period of weight will decrease and accompanied by decreased work productivity. The outcome of this study is in line with what was stated by Praditama (2011) in a study conducted in the village of Tiripan that there are still some people who do abstinence against some foods that are considered harmful to the condition of pregnant women, such as miscarriage or bleeding.

Clap et al.’s research in Shaw (2003) explains that pregnant women’s activity also influences nutritional status of pregnant women, the relationship between physical activity with nutritional status impact on pregnant women is complex seen from the burden of pregnant women will reduce the growth and birth weight and can be a factor that affects many pregnant women with chronic energy shortages.

As for the personal hygiene care, work done by Potter and Perry’s (2005) stated that culture or personal value affects the ability of personal hygiene care.

Someone from a different cultural background follows different personal hygiene practices.

Informants’ satisfaction in utilizing health facilities as described by Swastha (2005) which explains several factors influencing the utilization rate of health services are factors that come from health care providers and factors of the healthcare user community. The three factors of health care providers are health facilities, service costs, and distance. Whereas two factors from health service user community are education factor and socioeconomic status of society.

Many factors influence maternal compliance in ANC services regularly, including from individual characteristics that include age, education, economics, and knowledge. This is irrelevant to the condition of some informants who married at a young age, with low education and economics but still utilizing ANC services on a regular basis.

**Conclusion**

Based on the obtained results, the balanced diet that mothers apply during pregnancy varies. Starting from the frequency of eating the mother, healthy food consumed, to the type of food at risk during pregnancy. Physical activity patterns according to informants during pregnancy are done with different forms and reasons, the type of physical activity performed during pregnancy such as washing, sweeping, working in rice fields, raised water, and some other household chores. The forms of behaviour that informants present during pregnancy in maintaining personal hygiene are bathing regularly, shampooing, and brushing teeth. Maternal role models during pregnancy are health workers located in the nearest health service; this is because the majority of mothers will directly utilize health services in case of complaints during pregnancy. Support resources such as health service facilities and health personnel according to informants are considered good. Maternal compliance during pregnancy in utilizing antenatal care has support. Lastly, the informant agreed agrees that the birth helpers by medical personnel were good.

**Acknowledgment**

The author extends the appreciation to Palangga and Kampili health center of Gowa regency for the permission and the Faculty of Public Health, University Hasanuddin for unconditionally support.
Ethical Clearance: Taken from the committee
Source of Funding: Nil
Conflict of Interest: Nil

References


Awareness, Knowledge and Attitude towards Nutrigenomics among Health Care Workers in Indonesia: A Preliminary Exploration

Widyawaty N1, Tan C.K1, Tan E.S.S1, Seghayat M.S1, Normina A.B1
1School of Healthy Aging, Medical Aesthetics and Regenerative Medicine, Faculty of Medicine and Health Sciences, UCSI University

Abstract

Chronic diseases are rising in number and have become the leading cause of mortality in the world. These diseases can be controlled via diet and lifestyle modifications. Nutrigenomics recently emerge as a study area endeavoring to understand one’s response to diet at molecular level. Despite its rapid development, limited number of health care workers were exposed to nutrigenomics. Therefore, this study aimed to provide a preliminary insight on the baseline of awareness, knowledge, and attitude of nutrigenomics among health care workers in Indonesia. A questionnaire consisting of 18 questions was developed and distributed to nutritionists, general practitioners, and specialists in selected hospitals. Total of 114 questionnaires were completed and analyzed using SPSS software. Approximately 19.3% of participants have heard about nutrigenomics; awareness among nutritionists (55%) was significantly higher (p<0.05) compared to 7.1% for general practitioners and 13.6% for specialists. Furthermore, less than 15% of participants had good knowledge of nutrigenomics. Majority of participants acknowledged benefits of nutrigenomics and have strong interest to incorporate nutrigenomics into their clinical daily practice. Lack of knowledge and limited clinical evidences were considered as the first and second limitation. However, high eagerness to pursue a higher education and to embark nutrigenomics research were found. In conclusion, participants reported to have limited awareness and knowledge, but had positive attitude towards nutrigenomics. These findings are encouraging for future development and application of nutrigenomics in daily clinical practice.

Keywords: Awareness and Knowledge, Nutrigenomics, Health Care Workers.

Introduction

Nutrition takes an essential part in maintaining health and controlling disease in each individual. It is generally recognized that there is a significant association between diet and its function for health promotion and disease prevention1. Throughout the last century, nutritional science was only centered on presumptions that all individuals have similar nutritional requirements2. With focus mainly on vitamins and mineral, their use and requirements were researched and later defined by Recommended Dietary Allowance (RDA) for deficiency prevention which express the amount of a nutrient that is daily needed for general public to maintain healthy1,2.

With advancing awareness and knowledge on importance of nutrition as well as easy accessibility to food especially in urban and developed nations; international health issues shifted from undernutrition to include obesity and overnutrition1. According 2005’s report by World Health Organization (WHO), chronic diseases such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are leading causes of mortality in the world, representing 60% of all deaths4.

It is generally accepted that lifestyles and choosing food habits have a significant contribution in the development of non-communicable diseases. Thus, these kinds of disease are largely preventable through lifestyle changes, including diet modification3. Furthermore, many genes are considered to be interconnected with
certain chronic diseases. Consequently, focus of nutritional science changed to prevent the raise of these types of disease by investigating how diet and nutrition can maintain human health at cellular, tissue and organ level. In order to prevent the development of disease, increasing knowledge of nutrition at the molecular level are required. The rapid breakthrough of human genome has facilitated scientists and researchers to explore more about interaction between diet, gene expression, health and disease. As a result, partnership between nutrition and genomics science emerged leading to the development and advancement of nutrigenomics.

Nutrigenomics is a science of determining relationship between nutrients and genes' responses and consequently, its effect on human health. It was previously shown that nutrigenomics, which is frequently represented as most recent applications of genomics advancement in the field of personalized health interventions, had been connected with the idea of individualized dietary management based on personal’s specific genes. Regardless, nutrigenomics does not aim only individual with specific predisposition of genetic disorders that could be intervened with diet modification. Other than genetics, there are still various factors which can influence the response to diet such as age, sex, physical activity, and smoking.

Researchers agree that nutrigenomics will shift therapeutic approaches from curative to preventive. In addition, Fenech et al. argued that advancement in nutrition genomic technologies had increased expectations involving predictions of diseases and development of new prevention as well as therapy approaches.

It is anticipated that nutrigenomics could possibly boost awareness of the detection of contributed factors of metabolic mechanism at the genome or molecular level, which will be used to inhibit the onset and development of vary of cancer, diabetes, and cardiovascular disease that chronically developed and may have multifactorial etiologies. Personalized nutrition may offer prevention against onset and progression of these chronic diseases. It is acceptable that everyone are likely to be concerned about maintaining their health and well-being. This has made the increasing expectation of nutrigenomics application regarding the rising possibility for customization of personalized diet for wellness and disease prevention.

Rapid establishment of nutrigenomics has been anticipated for development of preventive health approaches. Unfortunately, the level of awareness towards this field has been found to be low with research on nutrigenomics are mainly roaring in developed countries. In addition, despite the field’s potential for development of preventative health approaches, exposure on nutrigenomics among healthcare professionals is limited.

With that in mind, this study aimed to provide a preliminary insight into the awareness, knowledge and attitude towards nutrigenomics among health care workers in Indonesia.

**Methodology**

**Research design**

This research is a cross-sectional, quantitative and self-administered questionnaire. This study focused on health care workers currently employed in selected target hospital in Jakarta, Indonesia. The participants of this study consisted of different groups of health care workers including nutritionists, general practitioner, and medical specialists. The questionnaire was designed to identify the baseline information of awareness, knowledge, and attitude towards nutrigenomics amongst health care workers in Indonesia. While some of the questionnaire items were adapted from previous studies.

**Research Instrument**

The demographic section consisted of four items: participant’s age, gender, occupation, and length of experience in nutrition field. Respondents’ awareness regarding the term of nutrigenomics was measured by using single “Yes/No” question. The questionnaire also included questions on how the participants acquire knowledge about nutrigenomics and questions evaluating their knowledge regarding nutrigenomics including knowledge on definitions, disciplines which might be relevant with nutrigenomics application and conditions which might be beneficial from nutrigenomics science. The questions also asked what would be the most reliable source to acquire knowledge about this field. The questionnaire will comprise of questions regarding the participants’ agreement toward benefits that nutrigenomics may offer by using questions with a five point Likert – type response scale (1= Strongly Disagree, 2= Disagree, 3=Uncertain, 4= Agree, to 5=...
Strongly Agree).

Questions to measure attitude towards nutrigenomics include the participants’ attitude towards including nutrigenomics in their practice and their outlook on further trainings, higher education and academic activities in this field. The questionnaire also contained “Yes/No” questions regarding the participants’ actual trainings and academic activities in nutrigenomics.

The last question was intended to determine the main limitation of applying nutrigenomics into their daily practice according to participants. Participants can select one or more answers among: high cost, no facilities, lack of evidence, knowledge limits, poor accuracy, ethics and medico-legal issues. In addition, participants were allowed to specify “Others” if they have another issue as a limitation.

**Ethical Approval**

This study had been approved by the ethical committee of the hospitals. All recruited participants were required to read and understand the information provided in participant information sheet outlining the purpose of study and benefits of participating in the research. Confidentiality and anonymity were warranted as well as no remuneration for participation. All participants were required to sign the informed consent indicating the participant’s voluntary completion of the questionnaire. This research is conducted in accordance to ethical principles in Declaration of Helsinki.

**Data Analysis**

Data analysis were done using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics were used to describe the levels of awareness, knowledge, and attitude of the participant groups. Cross tabulation chi-square analysis were used to make a comparison between groups according to their answers and socio-demographics characteristics. Significance for all statistical measures was determined at the 0.05 level.

**Result and Discussion**

A total of 163 questionnaires were distributed with a total of 114 questionnaires were returned and completed; actual response rate was 69.9%. Level of experience was divided into four categories. The most common duration of experience in the field of nutrition was less than 5 years (n=45, 39.5%). The number of participants who have been experienced for 6-15 years and 16-25 years were 33 (28.9%) and 28 (24.6%) respondents, respectively. While only seven percent (n=8) of them had been working in nutrition field for more than 25 years.

Questionnaires in part two comprised of questions determining level of awareness, sources of information as well as the participants’ knowledge. In order to assess Indonesian health care workers’ awareness about nutrigenomics, participants were asked “Have you heard of nutrigenomics?” Results reported that approximately four-fifths of participants (n= 92, 80.7%) had never heard about nutrigenomics. Only 19.3 % (n= 22) of participants had heard of nutrigenomics. However, those who had never heard about nutrigenomics were still able to answer the knowledge and attitude questions.

Occupation was significantly associated (p<0.05) with awareness of nutrigenomics. Among nutritionists, more than half of them (n=11, 55%) had heard about nutrigenomics compared to 7.1% (n=2) for general practitioners and 13.6% (n=9) for specialists (p<0.05). Association between awareness of nutrigenomics and other demographic characteristics were examined but not statistically significant. Table 1 outlines awareness of nutrigenomics among healthcare workers according to socio-demographic characteristics.

According to respondents, the most common sources of information were scientific meetings and conferences (n= 16, 72.7%). Meanwhile, others heard about nutrigenomics either from sharing among colleagues (n= 6, 27%) or as a part of their undergraduate studies (n= 5, 23%).
Table 1. Awareness of nutrigenomics according to socio-demographic Characteristics

<table>
<thead>
<tr>
<th>Characteristics (N= 114)</th>
<th>Yes</th>
<th>No</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>16</td>
<td>22.9</td>
<td>54</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>13.6</td>
<td>38</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤25 years</td>
<td>4</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>26-30 years</td>
<td>6</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>31-40 years</td>
<td>6</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>≥41 years</td>
<td>6</td>
<td>13.6</td>
<td>38</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutritionist</td>
<td>11</td>
<td>55</td>
<td>9</td>
</tr>
<tr>
<td>General Practitioner Specialist</td>
<td>2</td>
<td>7.1</td>
<td>26</td>
</tr>
<tr>
<td>9</td>
<td>13.6</td>
<td>57</td>
<td>86.4</td>
</tr>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5 years</td>
<td>8</td>
<td>17.8</td>
<td>37</td>
</tr>
<tr>
<td>6-15 years</td>
<td>9</td>
<td>27.3</td>
<td>24</td>
</tr>
<tr>
<td>16-25 years</td>
<td>4</td>
<td>14.3</td>
<td>24</td>
</tr>
<tr>
<td>&gt; 25 years</td>
<td>1</td>
<td>12.5</td>
<td>7</td>
</tr>
</tbody>
</table>

*p<0.05 on chi-square analysis

Level of nutrigenomics knowledge was determined through participants’ familiarity with definitions of nutrigenomics. This suggested description of nutrigenomics was agreed by 81.6% (n= 93) of respondents. 4% (n= 3.5%) of participants rejected this definition and 14.9% of respondents chose to answer “don’t know”. Good knowledge regarding definition of nutrigenomics was only significantly associated with age. All respondents aged 25 years and below agreed with the definition of nutrigenomics given (p<0.05) as shown in Table 2.

Table 2. Participants’ agreement on nutrigenomics definition according to sociodemographic characteristics

<table>
<thead>
<tr>
<th>Characteristics (N= 114)</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>58</td>
<td>82.8</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Male</td>
<td>35</td>
<td>79.5</td>
<td>2</td>
<td>4.6</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤25 years</td>
<td>10</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>26-30 years</td>
<td>26</td>
<td>86.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>31-40 years</td>
<td>19</td>
<td>63.3</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td>≥41 years</td>
<td>38</td>
<td>86.4</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Overall score obtained from knowledge-related questions was calculated to determine participants’ total knowledge score. The maximum score is 12 and participants scoring above 11 were considered to have good knowledge. Of the 114 participants who completed the knowledge section, the mean knowledge score was 9.59 out of 12 (SD= 1.54, Median= 9.79).

Only 14% of respondents (n=16) were classified as having good knowledge of nutrigenomics based on this criteria. There were no significant association found between level of overall knowledge and sociodemographic characteristics. Nevertheless, knowledge level was much the same between females than males, with 14.3% of females and 13.6 % of males indicating they had good knowledge of nutrigenomics prior to the survey whereas knowledge level was approximately ten percent higher for them who had been experienced in nutrition field for more than 25 years compared to another groups. Result also indicated that level of knowledge was mostly homologous between age groups, with approximately 10-15% for each group had obtained good level of nutrigenomics knowledge. General practitioner showed the least percent of respondents (3.6%) with good knowledge about nutrigenomics, in comparison with 16.7% of specialists and 20% of nutritionists as shown in Table 3.

### Table 3. Level of overall knowledge according to socio-demographic characteristics

<table>
<thead>
<tr>
<th>Characteristics (N= 114)</th>
<th>Good Knowledge</th>
<th>Poor Knowledge</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>14.3</td>
<td>60</td>
</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>13.6</td>
<td>38</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤25 years</td>
<td>1</td>
<td>10.0</td>
<td>9</td>
</tr>
<tr>
<td>26-30 years</td>
<td>5</td>
<td>16.7</td>
<td>25</td>
</tr>
<tr>
<td>31-40 years</td>
<td>3</td>
<td>10.0</td>
<td>27</td>
</tr>
<tr>
<td>≥41 years</td>
<td>7</td>
<td>15.9</td>
<td>37</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nutritionist</td>
<td>4</td>
<td>20.0</td>
<td>16</td>
</tr>
<tr>
<td>General Practitioner</td>
<td>1</td>
<td>3.6</td>
<td>27</td>
</tr>
<tr>
<td>Specialist</td>
<td>11</td>
<td>16.7</td>
<td>55</td>
</tr>
<tr>
<td>Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5 years</td>
<td>5</td>
<td>11.1</td>
<td>40</td>
</tr>
<tr>
<td>6-15 years</td>
<td>4</td>
<td>12.1</td>
<td>29</td>
</tr>
<tr>
<td>16-25 years</td>
<td>5</td>
<td>17.9</td>
<td>23</td>
</tr>
<tr>
<td>&gt; 25 years</td>
<td>2</td>
<td>25</td>
<td>6</td>
</tr>
</tbody>
</table>
In order to determine participants’ attitude toward nutrigenomics in the future, they were asked to indicate their willingness to include nutrigenomics into daily practice and pursue a higher education on nutrigenomics. Slightly more than four-fifths of participants (81.6%, n=93) reported a willingness to incorporate nutrigenomics into their practice. Concurrently, nearly three-fourths of participants (74%, n=73) indicated willingness to pursue a higher education on nutrigenomics.

Willingness to integrate nutrigenomics into daily practice was not found to be significantly associated with any socio-demographic characteristics. Meanwhile, there was significant association between willingness to pursue higher education with age as well as occupation. Compared to another occupation, almost all of nutritionist (95%, n= 19) felt like to get better knowledge of nutrigenomics through formal higher education (p<0.05). Among age group, willingness to pursue higher education was extremely higher in “<25 years” group (90%) than in other age group (p<0.05). No statistically significant association were found with the other two socio-demographic characteristics.

The result showed only 14% (n=16) of participants had recently attended training, scientific meetings and conferences in nutrigenomics. Participants were being asked about their interest for nutrigenomics-related training, scientific meeting and conferences with 18.4% (n= 21) respondents were extremely interested and 70.2% (n= 80) participants were interested. Other than training and any scientific events, participants were being asked about their actual involvement in research and academic activities on nutrigenomics with only 1.8% (n= 2) of respondents were currently involved in nutrigenomics-related research and academic activities. When being probed about their interest; 8.8% (n= 10) respondents were extremely interested and 48.2% (n= 55) respondents were interested to be involved in research and academic activities on nutrigenomics.

Curiosity to participate in scientific meeting and conferences in nutrigenomics was only found to be significantly associated with gender. Association between excitement to know more about nutrigenomics through scientific meetings and other socio-demographic characteristics were tested but no statistically significant associations were found. On the other hand, there was no significant association between excitement on nutrigenomics research and sociode mographic characteristics.

Participants were also asked what challenges that limiting the nutrigenomics application in daily practice. If applicable, they were allowed to choose more than one answer. Most of the survey participants thought knowledge limits as a limitation of nutrigenomics application which was accounted for a little more than 30% of responses (n= 66), followed by lack of evidence (22%), lack of facilities (19%) and then high cost (19%). Ethics medico-legal issues and poor accuracy accounted for 7% and 2% of responses, respectively.

Thus overall, this appears to be a pioneering questionnaire conducted among healthcare personnel in Indonesia to gauge their awareness, knowledge, and attitude about nutrigenomics. Health care workers were primarily targeted because public tends to consult their physician for information and guidance on nutrigenomics service6,7. Nutrition has a tendency to be associated with preventive medicine; thus, it is considered to be fundamental for nutritionists and medical practitioners (general practitioner and specialist) as well as geneticists to be competently educated in this field2. Therefore, having awareness and adequate knowledge of nutrigenomics are important so that their trustworthiness and practice are appropriately applied and not violated. Moreover, rising popularity of preventive medicine

Results revealed significant association between awareness and occupation; nutritionist were reported to have highest awareness. With regard to occupation, nutritionists/dietitians tend to more aware about nutrigenomics which was similar to previous research which reported that approximately half of registered dietitians in Canada were aware about nutrigenomics11. One plausible explanation may be that nutritionists or dietitians focus on diet-management for treating the patients.

Measurement of knowledge regarding agreement on definition of nutrigenomics in this study suggested that majority of health care worker agreed with the proposed definition of nutrigenomics, followed by its significant association with age of respondents. Health care workers aged 25 years and below were found to be more appreciative regarding definition of nutrigenomics. Other than better accessibility to information, Cormier et al11. argued that young health care worker had more
opportunities and probabilities of being exposed during their academic activities.

It is challenging for health care professional to gain awareness on nutrigenomics, to delay onset of disease as well as to prevent progression of disease. Moreover, Weir et al. argued that this inadequate proficiency might lead to skepticism towards nutrigenomics. Thus, it is not surprising that most of health care workers had low level of knowledge on nutrigenomics based on results obtained from this research. Despite nutritionists having a higher level of awareness, it is interesting that level of overall knowledge was not significantly associated with occupation as well as other socio-demographics characteristics such as age, gender, and experience. However, this result might be due to small sample in this study.

Assuming better level of knowledge would be gained through exposure of these topics during training programs, only a small minority of health care workers in Indonesia had recently attended training, scientific meetings and conferences in nutrigenomics. This might be the reason for low awareness of nutrigenomics in this study, as learning process definitely will affect knowledge and awareness on the subject matter. Interestingly, high willingness to attend training, scientific meetings and conferences in nutrigenomics was reported which suggests positive attitude towards increasing awareness and knowledge among health care workers in Indonesia.

Knowledge limit will restrain healthcare workers to integrate nutrigenomics into their daily practice. To overcome this, evidence-based approach is postulated to be one of the effective ways to give health care workers an assurance that nutrigenomics would be applicable in clinical practice. Thus, more research and other academic activities in this field is urgently needed to boost the number of evidence.

Conclusion

Despite of the fact that the participants shown limited awareness and knowledge, they had positive attitudes towards nutrigenomics. These data imply that majority of respondents acknowledged benefits of nutrigenomics and have a strong interest to include nutrigenomics in daily practice. Knowledge limits was considered as main limitation of nutrigenomics application in daily practice. A comprehensive education program may be necessary to increase healthcare workers’ knowledge of nutrigenomics and assist in the application into their practice in the future. The lack of evidence was also noted as second limitation, which should inspire researchers to conduct more research to gain more convincing evidence in this field. In conclusion, these findings are encouraging for future development of nutrition and genomics collaboration to prevent or treat many kind of diseases including chronic diseases on health care professionals’ daily practice when applicable.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

2. M. Fenech, A. El-Sohemy, L. Cahill, L.R. Ferguson, T.-A.C. French, E.S. Tai, J. Milner, W.-P. Koh, L. Xie,
Consumption of Malay Herbal Medicine (MHMs) During Pregnancy and Postpartum

Normina A.B.1, Noradhiyah T.1, Y.B. Ho2, C.K. Tan1, M.S. Seghayat1, Mirnalini Kandiah3, A.Z. Aris4, E.S.S. Tan1

1Faculty of Medicine And Health Science, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia, 2Department of Environmental and Occupational Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia, 3Faculty of Applied Science, UCSI University, 56000 Cheras, Kuala Lumpur, Malaysia, 4Environmental Forensic Research Centre, Faculty of Environmental Studies, Universiti Putra Malaysia UPM, 43400 Serdang, Selangor, Malaysia

Abstract
All around, natural medication is an undeniably sought after elective drug. They had been expended for ages to enhance one’s prosperity. In Malaysia, Malay home grown medications (MHMs) are ordinarily expended amid pregnancy and baby blues by moms of the Malay people group. This investigation is a similar poll consider including 106 baby blues Malay moms; comprising of 64 customers and 42 non-shoppers. Respondents were met amid their postnatal visits to decide their socioeconomics, example of MHMs’ utilization and pregnancy and neonatal qualities. Top three MHMs devoured were Ubat Periuk (12.5%, n=8), Manjakani (26.6%, n=17) and Nona Roguy repression set (20.3%, n=13). Utilization of MHMs amid pregnancy did not impact preterm conveyance and in addition neonatal birth weight, birth length, and head boundary. The revealed chances proportion for neonatal jaundice and requirement for phototherapy were 1.03 and 2.78 separately. Then, moms who did not expend MHMs amid pregnancy revealed bring down occurrences (p<0.05) and bring down hazard (OR=0.25) of undermined premature births. Higher dangers of neonatal jaundice were found for baby blues utilization. As an end, family unit salary was an affecting statistic factor for MHMs utilization. Requirement for phototherapy about tripled with pregnancy utilization; while, non-utilization seems, by all accounts, to be defensive against undermined fetus removal.

Keywords: Herbal medicine; malay medicine; pregnancy; postpartum

Introduction
Herbal medicine is a debatable method of treating diseases nowadays. It becomes very popular and some say as the safest approach to cure diseases in our society. The popularity is indeed overwhelmed in Malaysia itself. According to World Health Organization1, in Malaysia, offers of customary and reciprocal/elective meds are evaluated to be 1000 million Malaysian Ringgit yearly. Clearly, this occasion isn’t just in Malaysia yet in addition to every single creating nation for the most part.

At last, it is verifiable that home grown drug is started from plants. As indicated by Firenzuoli and Gori2, home grown prescription is the utilization of therapeutic plants for counteractive action and treatment of ailments. This has related to Saad et al.3 when they quote that home grown drug is a custom go about as they have referenced; in light of the data acquired from different investigations, the status of information concerning wellbeing and adequacy of restorative plants utilized in our district.

Addo4 concurred that home grown medications are regularly advanced as ‘characteristic’ and ‘safe’ and these cases may essentially pull in pregnant ladies

Corresponding author: E.S.S. Tan
E-mail: eugenietan@ucsiuniversity.edu.my, normina@ucsiuniversity.edu.my
who are frequently worried about their unborn kid’s prosperity. Malay’s way of life has a convention, which they are custom and have incredible regard towards the elderly individuals in their family. These more seasoned ladies frequently fill in as guards and assume an essential job in transmitting conventional qualities and works on encompassing pregnancy, labor, and baby blues care.

Another fascinating aim that prompts this gathering of moms to devour Malay home grown drug is because of the impulse to give the best to their infants. Louik et al. depicted as uneasiness leads pregnant ladies more remote lean toward home grown prescription paralleled to current medications. This conduct is a common mother intuition concerning the tyke they conveying with.

The main wellspring of Malay home grown prescription utilization is dominantly from the nearest and closest individual alongside the pregnant and baby blues moms. As indicated by Mothupi in his examination, family and companions speak to the social and social condition in which the pregnant lady lives and to some extent impact wellbeing looking for conduct amid pregnancy. Another investigation done by Tang et al. likewise concurred that family particularly the more established age, for example, maternal mother and relative, was the primary wellspring of referral on home grown utilization. Most pregnant ladies trust that these prescriptions are ‘normal’ and ‘safe’ contrasted with present day drugs. As per Bayisa et al., customary prescription is accepted to treat restorative issues and enhance the wellbeing status amid pregnancy, birth and baby blues care in numerous country territories of the world.

Studies have demonstrated the relationship between utilization of natural meds and neonatal jaundice, and utilization of home grown prescriptions with lead focus in bosom drain. These examinations are not made for a wide range of home grown medications, which we know there will never be finishing rundown of Malay home grown meds moving over the counter. We require some solid and satisfactory further research for an explicit kind of home grown medications to set up the adequacy and security of these home grown drugs utilization.

With that in mind, this study aimed to justify the herbal medicine consumption effect among pregnant and postpartum mothers who are breastfeeding particularly. This study focusing on Kuala Lumpur area where there is a modern community of Malay population targeted here.

**Methodology**

**Research Design**

This research was a pilot study, where a total of 106 participants were taken for sampling. Consent was taken before the sample collection begun for participation of this study. Upon consent, the respondents were given a set of questionnaire. The purpose of the questionnaire was for data collection of socio-demographic, maternal, pregnancy, postpartum and infant characteristic, as well as frequency and usage of herbal medicine. All questionnaires answered will be reviewed and analyzed.

**Research Participants**

This study dedicated on pregnancy and postpartum mothers at Klang Valley, Malaysia. The participants of this study are housewives and working mothers. The inclusion criteria for this study are Malaysian, women less than 3 months of post partum duration, term pregnancy and consented. The exclusion criteria for this study are age below than 18 years old and not more than 60 years old. Mentally and physically not fit to participate in the research. Free from occupational hazard and metal exposure.

**Data Collection**

The questionnaire was designed to get the information regarding consumption of Malay herbal medicine (MHMs) during pregnant and postpartum mothers. The questionnaire consisted of seven sections, which the data including socio-demographic, maternal characteristics, pregnancy characteristic, postpartum characteristic, infant characteristics, use of herbal medicine, and herbal medicine consumption frequency. Aggregate of members were 106 with 42 from control gathering and 64 from respondent gathering. All members have finished the survey effectively.

**Data Analysis**

Statistical Package for the Social Sciences (SPSS) software was utilized for statistical data analysis. Data analysis was done with descriptive analysis and Chi-squareross tabulation test. The characteristic of Malay herbal medicine consumption during pregnancy and postpartum as well as maternal characteristics and
infant characteristics were used for descriptive statistics. Significance level at 0.05 was used for all statistical measures.

**Result and Discussion**

Consumption During Pregnancy Versus Maternal Characteristics

Based on Table 1, remarkable changes notable towards Malay herbal medicines consumption pattern during each trimester of pregnancy as well as during confinement. According on previous pregnancies question divided into four categories: “0”, ”1”, ”2”, and ”≥3”. Respondent group showed 51.6% (n = 33) of amount for category “≥3”, followed by 17.2% (n = 11) for category “1” and “2” and only 12.5% (n = 8) for category “0”. The control group showed 47.6% (n = 20) for category “≥3”, followed by 21.4% (n = 9) for “1”, 16.7% (n = 7) for “0” and only 14.3% (n = 6) for “2”. Respondent group showed the total of 51.6% (n = 33) for “≥3” category. 31.3% (n = 20) and 17.2% (n = 11) for category ”2” and ”1”. Control group also showed the same pattern with category “≥3” brings the highest number of non-consumption 42.9% (n = 18), followed by 31.0% (n = 13) and 26.2% (n = 11) for category ”2” and ”1” each. Weight gain category showed average amount for both respondent and control group with 13.54 ± 11.6 and 13.7 ± 7.6 increments. Weight loss category similarly showed the same average of reduction of 9.8 ± 6.0 and 10.3 ± 4.7 from respondent and control group each. This showed consumption and non-consumption of Malay herbal medicine displayed no significant influenced of weight increment or weight reduction.

**Table 1. Maternal Characteristic of Participants**

<table>
<thead>
<tr>
<th>Maternal characteristics</th>
<th>Patient N(%)</th>
<th>Control N(%)</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Previous pregnancies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>8(12.5)</td>
<td>7(16.7)</td>
<td>0.860*</td>
</tr>
<tr>
<td>1</td>
<td>11 (17.2)</td>
<td>9 (21.4)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>11 (17.2)</td>
<td>6 (14.3)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>33 (51.6)</td>
<td>20 (47.6)</td>
<td></td>
</tr>
<tr>
<td><strong>How many children</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>11(17.2)</td>
<td>11(26.2)</td>
<td>0.466*</td>
</tr>
<tr>
<td>2</td>
<td>20(31.3)</td>
<td>13(31.0)</td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>33(51.6)</td>
<td>18(42.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Weight gain (kg)</strong></td>
<td>13.54 ± 11.6</td>
<td>13.7 ± 7.6</td>
<td>0.954\b</td>
</tr>
<tr>
<td><strong>Weight loss (kg)</strong></td>
<td>9.8 ± 6.0</td>
<td>10.3 ± 4.7</td>
<td>0.773\b</td>
</tr>
</tbody>
</table>

\*Pearson Chi-square  
\bIndependent T-Test

Consumption During Pregnancy Versus Pregnancy characteristics

Based on Table 2, it showed that threatened abortion cases with respondent group 53.8% (n = 7) otherwise for control group showed 22.6% (n = 21) for “yes” category and “no” category reported respondent group showed 46.2% (n = 6) and for control group with 77.4% (n = 72) as shown in Table 4.4. Pregnancy related illness category showed 30.8% (n = 4) of respondent group and 21.5% (n = 20) of control group with “yes”. Result showed 69.2% (n = 9) of respondent group and 78.5% (n = 73) of control group with the answer “no”. Chronic illness category, “yes” category showed same result for both respondent group and control group with total of 50% (n = 3).
Table 2. Pregnancy Characteristic of Participant

<table>
<thead>
<tr>
<th>Pregnancy Characteristics</th>
<th>Patient N(%)</th>
<th>Control N(%)</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatened abortion during this pregnancy?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7 (53.8)</td>
<td>21 (22.6)</td>
<td>0.038a</td>
</tr>
<tr>
<td>No</td>
<td>6 (46.2)</td>
<td>72 (77.4)</td>
<td></td>
</tr>
<tr>
<td>Pregnancy related illness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4(30.8)</td>
<td>20 (21.5)</td>
<td>0.485</td>
</tr>
<tr>
<td>No</td>
<td>9(69.2)</td>
<td>73(78.5)</td>
<td></td>
</tr>
<tr>
<td>Chronic illness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3(50.0)</td>
<td>3(50.0)</td>
<td>0.024a</td>
</tr>
<tr>
<td>No</td>
<td>10(10.0)</td>
<td>90(90.0)</td>
<td></td>
</tr>
<tr>
<td>Method of delivery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>10(76.9)</td>
<td>71(76.3)</td>
<td>1.000</td>
</tr>
<tr>
<td>Caesarean</td>
<td>3(23.1)</td>
<td>22(23.7)</td>
<td></td>
</tr>
</tbody>
</table>

Consumption During Pregnancy Versus Infant Characteristic

Notable for control group based on Table 3, the number of full term baby delivered showed 95.7% (n = 89) whereas for respondent group showed 100% (n = 13). 0% (n = 0) for respondent group showed “no” for full term baby and 4.3% (n = 4) from control group. Baby weight, length of baby and head circumference categories showed no significant changes of result for both respondent and control group. Respondent and control group showed birth weight result of 3.2 ± 0.3 and 3.1 ± 0.5 each. For length of baby category showed 47.2 ± 5.5 and 48.3 ± 3.8 each for respondent and control group result. Respondent group and control group for head circumference category showed 34.5 ± 4.8 and 33.4 ± 2.7. For the jaundice occurrence, respondent and control group each showed not a significant changes for neonatal jaundice, phototherapy and exchanged transfusion event with 76.9% (n = 10) and 77.4% (n = 72), 61.5% (n = 8) and 36.6% (n = 34), 0% (n = 0) and 4.3% (n = 4).

Table 3. Infant Characteristic of Participant

<table>
<thead>
<tr>
<th>Infant Characteristics</th>
<th>Patient</th>
<th>Control</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby Full term N(%)</td>
<td></td>
<td></td>
<td>1.000</td>
</tr>
<tr>
<td>Yes</td>
<td>13 (100)</td>
<td>89 (95.7)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0(0.0)</td>
<td>4 (4.3)</td>
<td></td>
</tr>
<tr>
<td>Birth weight</td>
<td>3.2 ± 0.3</td>
<td>3.1 ± 0.5</td>
<td>0.347</td>
</tr>
<tr>
<td>Length of baby</td>
<td>47.2 ± 5.5</td>
<td>48.3 ± 3.8</td>
<td>0.269</td>
</tr>
<tr>
<td>Head circumference</td>
<td>34.5± 4.8</td>
<td>33.4 ± 2.7</td>
<td>0.651</td>
</tr>
<tr>
<td>Jaundice N(%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neonatal</td>
<td>10(76.9)</td>
<td>72(77.4)</td>
<td>1.000</td>
</tr>
<tr>
<td>Phototherapy</td>
<td>8(61.5)</td>
<td>34(36.6)</td>
<td>0.129</td>
</tr>
<tr>
<td>Exchanged transfusion</td>
<td>0(0.0)</td>
<td>4(4.3)</td>
<td>1.000</td>
</tr>
</tbody>
</table>
Consumption During Confinement Versus Postpartum Characteristics

Based on Table 4 breastfeeding showed 94.3% (n = 50) for respondent group and 88.7% (n = 47) for control group to “yes” answer. “No” for breastfeeding question showed 5.7% (n = 3) and 11.3% (n = 6) for respondent and control group. Respondent group showed 5.7% (n = 3) and control group showed 1.9% (n = 1) for “yes” to confinement in a postpartum nursing center. Whereas option “No” for respondent group showed 94.3% (n = 50) and control group showed 98.1% (n = 51).

### Table 4. Postpartum Characteristic of Participant

<table>
<thead>
<tr>
<th>Postpartum Characteristics</th>
<th>Patient N(%)</th>
<th>Control N(%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50(94.3)</td>
<td>47 (88.7)</td>
<td>0.488</td>
</tr>
<tr>
<td>No</td>
<td>3(5.7)</td>
<td>6 (11.3)</td>
<td></td>
</tr>
<tr>
<td>Confinement in a postpartum nursing center</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3 (5.7)</td>
<td>1 (1.9)</td>
<td>0.618</td>
</tr>
<tr>
<td>No</td>
<td>50 (94.3)</td>
<td>51 (98.1)</td>
<td></td>
</tr>
<tr>
<td>Been outpatient clinic last 4 weeks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1(1.9)</td>
<td>1(1.9)</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>52(98.1)</td>
<td>52(98.1)</td>
<td></td>
</tr>
<tr>
<td>On any medication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2(3.8)</td>
<td>2(3.8)</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>51(96.2)</td>
<td>51(96.2)</td>
<td></td>
</tr>
</tbody>
</table>

Overall Discussion

Malay populace is among populace in Malaysia who devour home grown drug alongside Chinese and Indian populace. This investigation appeared, an aggregate of 64 members out of 106 members who have expended the Malay natural meds. This reality is appropriate with Holst et al.\textsuperscript{10} revelations that, half of the ladies expended natural drugs amid pregnancy or in the wake of conceiving an offspring. The pregnancy and baby blues moms who expended the herbs generally have the possibility that it is protected and trusted that the herbs were gotten from a characteristic source. As per Sooi and Keng\textsuperscript{12}, the high pervasiveness of natural meds use may most likely be because of the solid trusts that these herbs are sheltered. Tang et al.\textsuperscript{8} in their writing overmuch guaranteed that higher instructive dimension was connected to a higher commonness of home grown utilization, which this contradicted to our finding in this investigation. Over this, as indicated by Mothupi\textsuperscript{7} he held oppositely, which the utilization of natural medication was related with a lower dimension of instruction (p = 0.007). As indicated by Nordeng and Havnen\textsuperscript{12}, they concurred that clients of elective medications were factually altogether more frequently from a higher social class.

The utilization example of this Malay home grown prescription amid pregnancy in this examination obviously isn’t with any mindfulness on the security side of the herbs. This announcement endorsed by Sooi and Keng\textsuperscript{11} in their writing that decree ladies kept on devouring home grown medications over their pregnancy period without the absence of information about its security and advantage. As indicated by Zeng et al.\textsuperscript{14} amid pregnancy specifically, the pervasiveness of CAM (Complementary and Alternative Medicine) use was as high as 73.2% in china.

The most expended Malay home grown prescription in this examination is coconut oil (69.2%). This compared to Sooi and Keng\textsuperscript{11} count for the most normally utilized home grown prescriptions in pregnancy were Anastatica hierochuntica L. (60.1%) trailed by coconut oil (35.4%). Coconut oil, halba, ubat periuk, manjakani and spirulina...
unmistakably to be the most expended home grown for Malay populace and this contrasted with Kennedy et al.\textsuperscript{15} revelations that the best home grown prescriptions utilized in Western Europe have incorporate ginger, cranberry, raspberry, chamomile, valerian, and echinacea.

Utilization of Malay natural medication demonstrated no huge relationship to past pregnancies and number of youngsters in this investigation (p < 0.05). This finding is in opposition to Tang et al.\textsuperscript{8} as it was uncovered that ladies who had been pregnant before would in general utilize home grown cures amid pregnancy.

**Conclusion**

The entire participants reaction towards this study is overpowering. Despite there are few hurdles to get great number of control group to contribute in this study yet the objective can be achieved conclusively. This study and the data collection are the reflection of Klang Valley Malay community towards the Malay herbal medicine consumption pattern among pregnancy and postpartum mothers. The limitation here is the number of participant, which is relatively small to certainly construct a prodigious conclusion for this study. However, the need to create more awareness regarding herbal therapy is mandatory. This awareness is essential and need to be done from the education level, social activities coverage and media involvement. Despite of the Malay culture and tradition that play a big role and the main influence that build it embedded in this Malay population, the challenges unquestionably await for future research and study and must be taken profoundly. In conclusion, this study intensely looked-for further and greater sampling size for better outcome and result for the future study conduct.

**Acknowledgment:** This work was supported by Fundamental Research Grant Scheme (FRGS) from Ministry of Higher Education (FRGS/1/2014/SKK10/UCSI/03/1) and Pioneer Scientist Incentive Fund (PSIF) from UCSI University (Proj-In-FMS-026).

**Author Contributions**

Y.B.H, M.K., A.Z.A, E.S.S.T and A.B.N. conceived and designed the experiments; A.B.N., T.N., E.S.S.T. and C.K.T. analyzed the data; A.B.N., Y.B.H., A.Z.A and E.S.S.T. contributed reagents/materials/analysis tools; A.B.N., T.N., E.S.S.T., C.K.T. and M.S.S. wrote the paper. All authors read and approved the final manuscript.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** The authors declare no conflict of interest.

**References**

Social Demand and Future Prospective of ‘Anti –Aging Medicine among Malaysians

Ng CY¹, Seghayat MS¹, Tan ESS¹, Tan CK¹ Amini F¹, Thiagarajah S¹, Sharma D², Normina AB¹

¹School of Healthy Aging, Medical Aesthetics and Regenerative Medicine, Faculty of Medicine and Health Sciences, UCSI University, ²Department of Medicine, Faculty of Medicine and Health Sciences, University Tunku Abdul Rahman, Malaysia

Abstract

Anti-aging medicine cultivates a target for medical intervention. However, it is still a controversial topic which needs more research to provide a better understanding of safety and efficacy of anti-aging medicine. This study is aimed to evaluate Malaysians’ demand and awareness of anti-aging medicine. A questionnaire with 17 questions in four parts was developed to identify demographics profile, general health status, awareness of anti-aging medicine and treatment. Questionnaire was randomly distributed to the patients in a clinic in Kuala Lumpur. There were 200 consented volunteers (126 female and 74 male) who participated in the survey. Majority of participants were 25 to 34 years old. Overall, 70% of participants were aware of their general health status, 69 % (n=138) believed that Anti-aging medicine is a future lead in medicine. However, 30 % of participant were worried about unexpected adverse reaction. Almost half of participants (46.5%, n=93) acknowledged that they had no exposure to Anti-aging medicine previously. Half of the participants (n=100) indicated age group from 25 to 34 would be the best age to start anti-aging treatment. About 60% (n=120) believed that the ideal timing to see anti-aging effect is between 1 to 3 months. There were a total of 84.5% (n=169) participants who expected the pricing of anti-aging medicine and treatment to be less than RM500. A positive view and high demand toward anti-aging medicine and treatment was observed in this study. In light with the high degree of interest upon anti-aging medicine, it is foreseeable that the demand will increase in the future.

Keywords: Anti-aging; medicine; efficacy; safety.

Introduction

Aging is defined as a gradual changes in the structure of any organism that occur with the passage of time, in which it does not result from any disease of gross accidents¹ According to United Nation (UN) population division, the number of people aged over 60 years old is getting increasing from under 800 million to over two billion by 2050, which means representing about 11% to about 22% of the world population².

In Malaysia, by 2035 it is estimated to reach the ageing population status, with those above the age of 60 constituting 15% of the population³. The elderly population of Malaysia has shown a steady increase over the past years, and this is expected to continue⁴. Life expectancy among Malaysians has also risen to 71.51 years for men and 77.24 years for women, meanwhile total population life expectancy is 74.28 years in 2013⁵. It implied that, human nation demographics is going to shift to predominant aging nation.

With increasing numbers of aging population around the world, health care strategies is needed to cope with the rising numbers in order to maintain good physical and mental health of the society⁶ as well as emphasis on comprehensive health care system in the aspect of health, social security, housing, environment that includes the family and community⁷,⁸.

Study on public perception of longevity in relation to anti-aging medicine found supportive outlook towards

Corresponding author:
Normina AB
Email: normina@ucsiuniversity.edu.my,
marjansadat@ucsiuniversity.edu.my
anti-aging research with potential to increase maximum human lifespan by slowing aging\(^9\), particularly in older generation\(^10\).

Anti-aging medicine consumers preferred the results that last a long time versus immediate results as well as gradual results which last for two years compared to immediate results which could only last for six months\(^11\). The cost of treatment seems to be of less importance compared to longer lasting results. Physician training and expertise, duration of effect, cost, and recommendation by the physician are among the factors affecting decisions towards anti-aging treatment use\(^11\).

On the other hand, the most commonly voiced negative personal outcome of anti-aging technologies was that it would extend the number of years a person spent with chronic illnesses and poor quality of life\(^9\). In parallel, public also has their concerns about the possible adverse side effects of anti-aging drugs\(^9\).

Evidence of human life extension is sparse and at current time suggests that quality of life is maintained in laboratory animals with extended lifespan\(^12\). While life-extending effects of interventions in animal models are invoked as arguments for supporting anti-aging research, there is uncertainty in these interventions whether will also extend healthy lifespan in human\(^12\).

This research aimed to establish the relation between the public perceptions regarding anti-aging medicine in the cultural context of aging in Malaysia. With regards to the attitude and demand toward this related trend, the research will establish the future prospective of the anti-aging medicine in general practice setting.

**Methodology**

This is a cross sectional survey. The participants selected are Malaysians aged 18 and above residing in Kuala Lumpur. The questionnaire is set out to establish the participant’s demographics profile such as age group, gender, marital status, ethnicity, and monthly income and education levels.

The questionnaire was developed in English language and consisted of 23 questions in 5 different sections:

i. Demographic profile (6 questions),
ii. Respondent general health status (5 questions),
iii. Perception of Anti-aging medicine, (3 questions)
iv. Expectation on Anti-aging treatment (5 questions)
v. Respondent’s preference in getting Anti-aging treatment in future (4 questions)

Likert scale was used to rate the interest in related issue. The questionnaires were distributed randomly to respondents who visited the clinic during consultation from May to November 2013. Questionnaires were handed to respondents by the researcher and they would then be given a brief explanation regarding the intent and purpose of research. Thereafter, informed consent was obtained. The survey lasted for about 10 minutes. Collected data was analyzed using SPSS 20.0

**Result and Discussion**

A total of 200 participants were recruited in the survey. Majority of the participants were female (n=126, 63%). Age structure was divided in five categories: age below 25 years (n=55, 27.5%); age 25-34 years (n=85, 42.5%), age 35-44 years (n=40, 20%); age 45-54 years (n=15, 7.5%); and age above 55 years (n=5, 2.5%). Different ethnic groups were involved in the study with Malay population (n=115, 57.5%); Chinese (n=90, 45%); Indian (n=17, 8.5%); and others (n=8, 4%). Monthly income were categorized into income lesser than RM1000 (n=10, 5%); income RM1000-RM2999 (n=120, 60%); income RM3000-5999 (n=64, 32%); income RM6000-9999 (n=4, 2%); and income more than RM 10000 (n=2, 1%). Table 1 summarizes socio-demographics of participants.

**Table 1. Socio-demographic of participants**

<table>
<thead>
<tr>
<th>Characteristics(N=200)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>126</td>
<td>63.0</td>
</tr>
<tr>
<td>Male</td>
<td>74</td>
<td>39.0</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25 Years</td>
<td>55</td>
<td>27.5</td>
</tr>
<tr>
<td>25-34 Years</td>
<td>85</td>
<td>42.5</td>
</tr>
<tr>
<td>35-44 Years</td>
<td>40</td>
<td>20.0</td>
</tr>
<tr>
<td>45-54 Years</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td>≥55 Years</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Ethnic group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>115</td>
<td>57.5</td>
</tr>
<tr>
<td>Chinese</td>
<td>90</td>
<td>45.0</td>
</tr>
<tr>
<td>Indian</td>
<td>17</td>
<td>8.5</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>4.0</td>
</tr>
</tbody>
</table>


Out of the 200 participants, 70% of them are aware of their apparent general health status. They have given optimum rating upon their current health status. Most of them have been putting effort to improve their health status, including having regular exercise, adequate quality sleep, healthy organic diet with supplement, regular health check and healthy lifestyles. This health conscious group has their regular medical health check in their individual preference of health center. Around 30% of the participant has been found to be less aware of their health status at the moment with half of these participants were within the age group of 35-44. Hustle working lifestyle with family commitment as well as social circle engagement may be the factors that take up most of their time. On other aspect, most of the participants who were less aware of their health status are within the monthly income range of RM1000-2999. Table 2 outlines the awareness of participants on their general health according to socio-demographic characteristics.

Table 2. Awareness of participants on general health

<table>
<thead>
<tr>
<th>Socio-demographic</th>
<th>“Have you done anything to improve your health?”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes n (%)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>50 (25%)</td>
</tr>
<tr>
<td>Female</td>
<td>90 (45%)</td>
</tr>
<tr>
<td>Age (Yrs.)</td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>45 (22.5%)</td>
</tr>
<tr>
<td>25-34</td>
<td>73 (36.5%)</td>
</tr>
<tr>
<td>35-44</td>
<td>10 (5%)</td>
</tr>
<tr>
<td>45-54</td>
<td>9 (4.5%)</td>
</tr>
<tr>
<td>≥55</td>
<td>3 (1.5%)</td>
</tr>
<tr>
<td>Monthly Income</td>
<td></td>
</tr>
<tr>
<td>&lt;RM1000</td>
<td>10</td>
</tr>
<tr>
<td>RM1000-RM2999</td>
<td>120</td>
</tr>
<tr>
<td>RM3000-RM5999</td>
<td>64</td>
</tr>
<tr>
<td>RM6000-RM9999</td>
<td>4</td>
</tr>
<tr>
<td>≥RM10000</td>
<td>2</td>
</tr>
</tbody>
</table>

Most of the participants gave similar perception upon Anti-aging medicine. Majority of participants (n=138, 69%) referred Anti-aging medicine as a future lead in medicine field. However, some participants have low confidence on the new emerging medicine with 30% (n=60) of them anticipating unexpected adverse reaction. Participants also believed that anti-aging treatments are applicable to older people (n=30, 15%) and the treatments and consultations are too costly (n=108, 54%). Some participants were skeptical on this new medicine, with 36% (n=72) of them alluding the current influences as a trend; and 45% (n=90) claimed it as a money making business. Table 3 summarizes the perception of participants towards anti-aging medicine.

Table 3. Participants’ perception towards anti-aging medicine

<table>
<thead>
<tr>
<th>“In your personal opinion, how do you see ‘Anti-aging medicine’?</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is a future medicine</td>
<td>138</td>
<td>69</td>
</tr>
<tr>
<td>May have unexpected side effect</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Is not an evidence based medicine</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>Only useful in old age people</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Only mean for rich people</td>
<td>108</td>
<td>54</td>
</tr>
<tr>
<td>Only a current trend</td>
<td>72</td>
<td>36</td>
</tr>
<tr>
<td>Money making business</td>
<td>90</td>
<td>45</td>
</tr>
</tbody>
</table>

More than half of the participants (n=107, 53.5%) reported previous exposure towards anti-aging medicine information, with health screening and medical consultation topping the list of the most common type of services anti-aging medicine could offer, according to the participants. Majority showed positive acceptance towards anti-aging medicine with 72% (n=144) indicated possible future need for anti-aging treatment, while 28% were not keen for the treatment at the moment. Table 4 shows the participants’ awareness towards anti-aging medicine.
Table 4. Awareness towards anti-aging medicine

<table>
<thead>
<tr>
<th>Items</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you been exposed to Anti-aging information?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>107</td>
<td>53.5</td>
</tr>
<tr>
<td>No</td>
<td>93</td>
<td>46.5</td>
</tr>
<tr>
<td>Do you think you need Anti-aging treatment at the moment?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>144</td>
<td>72</td>
</tr>
<tr>
<td>No</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td>If Yes, what types of services that you think Anti-aging clinic can offer to you?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health screening &amp; medical consultation</td>
<td>186</td>
<td>93</td>
</tr>
<tr>
<td>Hormonal replacement therapy</td>
<td>105</td>
<td>52.5</td>
</tr>
<tr>
<td>Medically weight losing treatment</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Dietician &amp; nutritionist consultation</td>
<td>131</td>
<td>65.5</td>
</tr>
<tr>
<td>Skin &amp; esthetic treatment</td>
<td>139</td>
<td>69.5</td>
</tr>
<tr>
<td>Image makeover consultation</td>
<td>133</td>
<td>66.5</td>
</tr>
<tr>
<td>Hypnosis &amp; relaxation therapy</td>
<td>86</td>
<td>43</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Majority of participants reported decreased in energy and vigor, menopause or andropause; and decreased sexual function (n=150, 75%). as the main concerns about aging (Table 5). In addition, participants perceived that anti-aging medicine could results in prevention and delay of age-related diseases (n=156, 78%), optimization of aging process (n=144, 72%) and improvement of facial aging appearance (n=144, 72%) (Table 6).

Table 5. Participants’ aging concerns

<table>
<thead>
<tr>
<th>Aging concerns</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degenerative disease of aging</td>
<td>144</td>
<td>72</td>
</tr>
<tr>
<td>(e.g. osteoporosis, stroke, heart attack)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Changes in skin and hairs</td>
<td>126</td>
<td>63</td>
</tr>
<tr>
<td>(e.g. wrinkles, brown spot, grey hair)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decrease in energy and vigor</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>Less social engagement</td>
<td>138</td>
<td>69</td>
</tr>
<tr>
<td>Loneliness &amp; depression</td>
<td>138</td>
<td>69</td>
</tr>
<tr>
<td>Menopause / Andropause</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>Decreased sexual function</td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>Decrease memory/cognitive disability</td>
<td>138</td>
<td>69</td>
</tr>
<tr>
<td>(e.g. dementia)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6. Participants’ perception on anti-aging medicine outcome

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimizing aging process</td>
<td>144</td>
<td>72</td>
</tr>
<tr>
<td>Longevity</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>Physical fitness</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>Improve facial aging appearance</td>
<td>144</td>
<td>72</td>
</tr>
<tr>
<td>Prevent &amp; delay aged related disease</td>
<td>156</td>
<td>78</td>
</tr>
<tr>
<td>Improve sexual satisfaction</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>Improve quality of sleep</td>
<td>54</td>
<td>27</td>
</tr>
</tbody>
</table>

Half of the participants (n=100, 50%) indicated age range of 25 to 34 years old as the best age to start anti-aging treatment. On average, most of participants reported the ideal timing to observe the therapeutics effects at one to three months (n=120, 60%) while 19% (n=38) of participants expected the effects within four to six months and 15% (n=30) expected the effects within one month.

Majority of participants were willing to pay for anti-aging treatment at the cost of less than RM50 (n=74, 37%), while 25% (n=50) at the cost of RM50 to RM199, and 22.5% (n=45) at the cost of RM200 to RM499. The participants showed positive interest on the anti-aging treatments, with 55% (n=110) foresee rapid increase of demand within five years, while 41% (n=82) foresee the demand to moderately increased (Figure 1).

Majority expressed moderate interest in anti-aging medicine (n=122, 61%), while 35% (n=70) were very interested to pursue anti-aging treatment modalities (Figure 2).

Thus overall, A total of 200 respondents were recruited in this study. Most of the respondents believed that anti-aging medicine is the future of medicine with majority of the respondents indicated keenness for anti-aging treatment. This is similar to previous studies done in Australia and Canada which showed overall positive interest towards anti-aging medicine.

Public perception and interest seem to be positive towards emergence of anti-aging modalities as part of medicine. However, despite the positive outlook, concerns on negative impact and unexpected adverse effects of anti-aging medicine remains in mind of the participants. One of the potential common issues in between will be the advocates failed to persuade or educate the public regarding the human life extension updates. Thirty percent of respondents anticipated possible adverse effects from Anti-aging medicine.

![Figure 1. Participants’ expected demand of anti-aging medicine within five](image1)

![Figure 2. Participants’ interest in anti-aging medicine](image2)
However, throughout the study, some participants had shown interest by prompting for more information about Anti-aging medicine including availability of Anti-aging treatment in the clinic, proven safety and efficacy of the Anti-aging medicine, as well as price and cost of the treatment. Excellent Willingness to Accept for Anti-aging medicine was also reported. Only 1% of respondent was not interested in Anti-aging medicine. This is in line with the findings of a study in Canadian population which elicited a strong predictor of support toward this new emerging science. The researchers concluded that the population acceptance level is so supportive that encouraged further contribution of the life extension science in the society.

In this study, age group of 25 to 34 was the most indicated target group (50%) to receive anti-aging treatment. A previous study done in University of Toronto found that both middle age and older age groups were more favourable towards Anti-aging treatments compared to younger age group. This might be due to financial ability of older age groups.

Most of respondents indicated that Anti-aging medicine played a role in prevention and delay of age related diseases (78%), aging optimization (72%), facial aging (72%), physical fitness (51%), sexual satisfaction (51%) and sleep quality (27%). In regards of future prospective, more than half of them (55%) anticipate rapid increase of development in the next five years.

When comes to factors influencing patients to go for Anti-aging treatments, the expected duration to see effects as well as cost of the treatment were main factors of consideration for the treatment. In addition, 60% of participants thought that ideal timing to see effects was between 1-3 months. Meanwhile, 84.5% of the participants expected Anti-aging treatment to cost less than RM500. Contrary to the first world countries, long-lasting results and physician training as well as expertise were more influential than cost of treatment.

**Conclusion**

Positive views alongside high demand towards Anti-aging medicine and treatment were observed in this study. Although almost half of respondents had expressed concerns regarding possible adverse effects resulting from Anti-aging treatments; the dissemination of information and knowledge might help to enlighten the public with both benefits and side effects. Physicians should also look into public expectations of Anti-aging treatment outcomes as well as pricing to ensure mutual satisfactions following Anti-aging treatments. In light with high degree of interests in Anti-aging medicine, it is foreseeable that its demand will increase in the future.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**

3. J. Vallin, Age (Omaha). 2001;16.
Predicts the Successfulness of a Trial Voiding Without Catheter (TWOC) Through Urine Retention Volume, Detrusor Wall Thickness (DWT) and Intravesical Protrusion of Prostate (IPP) on Acute Urinary Retention (AUR) Patients Due to Benign Prostatic Hyperplasia (BPH)

Dian Kurniasari¹, Budiono², Tarmono¹, Hardjowijoto¹ and Soetojo¹
¹Department of Urology, Faculty of Medicine, Airlangga University, Surabaya 60115, East Java, Indonesia
²Department of Public Health, Faculty of Medicine, Airlangga, Surabaya 60115, East Java, Indonesia

Abstract

This study aimed to identify the successfulness of Trial Voiding without Catheter (TWOC) on acute urinary retention (AUR) patients due to Benign Prostatic Hyperplasia (BPH), based on urine retention volume, Detrusor Wall Thickness (DWT) and Intravesical Protrusion of Prostate (IPP). The 24 patients over 50 years old underwent catheter per urethra and recorded urine volume at retention. Transabdominal ultrasound was performed several days later to evaluate the thickness of the Detrusor Wall Thickness (DWT) and intravesical protrusion (IPP), and detrusor IPP is classified as free de 1 (0 -<5 mm), grade 2 (5-10 mm) and grade 3 (> 10 mm). Trial voiding without catheter (TWOC) was carried out on day 5 and was considered successful if the patient was able to spontaneously micturition during first 6 hours, post voided residual volume (PVR) <100 ml, and maximum flow rate (Qmax)> 10 ml / second . Data will be analyzed by simple and multiple logistic regression test with significance level (α = 0.05). The result demonstrate the detrusor muscle thickness examination and IPP degree can be used to predict TWOC success, while urine retention volume does not affect the success of TWOC.

Keywords: Acute urinary retention (AUR), Benign Prostatic Hyperplasia (BPH), Detrusor Wall Thickness (DWT), Post Voided Residual Volume (PVR), Protrusion of Prostate (IPP), Trial Voiding without Catheter (TWOC)

Introduction

Benign prostate hyperplasia (BPH) is a benign tumor in men whose incidence is related to age. The incidence of BPH in autopsy research in men are aged 41-50 years is 20%, age 51-60 years 50%, age 61-70 years by 65%, age 71-80 years 80%, and obtained 90% BPH in men age 81-90 years¹. Urine retention is the condition of patient cannot remove urine collected in the bladder so that the maximum capacity of the bladder is exceeded. Urine retention can be classified as acute urinary retention (AUR) and chronic urinary retention (CUR)². Urologists generally divide urine retention episodes based on: the patient’s ability to excrete urine (complete or partial), duration (acute or chronic), symptoms (with pain or painless), mechanism (obstruction or non-obstruction), and examination findings urodynamic (high pressure or low pressure)³.

Acute urine retention (Acute Urinary Retention / AUR) is a urological emergency characterized by an inability to remove urine (voiding) accompanied by lower abdominal pain, and usually can be overcome by catheter placement. The management of AUR due to BPH can be treated by perform surgery and use of a long-term catheter. Besides that, the Trial voiding Without Catheter (TWOC) accompanied by medical therapy demonstrates...
increases success rate. A selective TWOC is needed to minimize the suffering of patients due to long-term catheter use and reduce total cost of care. If the success of TWOC can be predicted beforehand, then the patients who are expected to succeed can be continued with medical therapy, whereas if it is predicted to experience failure, it can be immediately planned for active action for definitive therapy, without having to do a TWOC trial first. However, the standard protocol on TWOC is still unclear. Research on factors that can predict the success of TWOC to date has not been widely studied.

The modalities that are estimated to affect success of TWOC are the amount of urine volume during retention, which according to Drasa obtained a cut-off point value of 500 ml, with a sensitivity of 100%, a volume of 750 ml with a sensitivity of 76% and 1000 ml with a sensitivity of 18.3%. Whereas in the Reten-Survey, univariate regression analysis showed that the urine volume at retention of <1000 ml was related to the success of TWOC (p <0.001).

Another modality that can be used and non-invasive is the detection of detrusor muscle thickness or Detrusor Wall Thickness (DWT) and Intravesical Protrusion of the Prostate (IPP) using transabdominal ultrasonography. The detrusor will thin only until the volume of bladder is 250 ml, and then the detrusor thickness will stabilize until the maximum capacity of the bladder is reached. The degree of IPP is divided into three, namely: grade 1: IPP <5 mm, grade 2: IPP 5-10 mm, and grade 3: IPP> 10 mm.

Meanwhile, the relationship between urodynamic parameters, outcomes of therapy management and improvement of symptoms, is still controversial. With these considerations it is necessary to have a diagnostic modality that is non-invasive, easy, fast and more efficient when compared to urodynamic examinations in predicting the outcome of TWOC in patients with acute urine retention due to BPH so that a more selective assessment will be obtained in determining the choice of therapy in BPH sufferers. One of the non-invasive diagnostic modalities is the measurement of the amount of urine volume during retention, intravesical protrusion of the prostate (IPP) and detrusor wall thickness (DWT) tests that are carried out using ultrasonography, which in some studies shows that only two of the parameters are used to estimate the obstruction and success of the TWOC. This study used the three mentioned parameters to determine and prediction the successfulness of the TWOC.

Methodology

The study was conducted using an observational analytic study design with cross sectional form. The sample size was the patients with acute urine retention due to BPH that admitted to the Emergency Room, Urology Polyclinic and Urological Minimally Invasive Installation (IU), Dr. Soetomo Surabaya Hospital. There were 24 patients participated in this study during December 2014 and March 2015.

The respondent criteria included first time admitted patients that caused by BPH and catheter placement was done per urethra. Besides that, the respondents aged above 50 year old and willing to participate by fill out and sign the study approval statement form. This study did not consider as BHP patients with recurrent urinary retention, had prostate surgery and have alpha blocker therapy, 5 α reductase inhibitors in the past 2 weeks. Besides that, the patients with pathology other than BPH, such as bladder and urethra stones, prostate malignancy, bladder malignancy, urethral stricture, diabetes mellitus, neurological disorders as well as urinary tract infection will not considered in this study.

The variable examined in this study is the amount of urine volume during retention (initial urine when installed catheter), detrusor muscle thickness / detrusor wall thickness (DWT), and intravesical prostatic protrusion (IPP). TWOC is declared successful, if after the catheter is equipped, the patient can spontaneously micturition in less than or equal to 6 hours, and the ultrasound and uroflowmetry examination show the post void residual urine (PVR) <100 ml, and $Q_{\text{max}} > 10$ ml / sec.

The independent variables consisted the urine volume during retention, detrusor wall thickness (DWT), and intravesical prostatic protrusion (IPP), while the dependent variable was TWOC success outcome. The data was analyzed descriptively and analytically. Non normality test is performed as the dependent variable is categorical dichotomous. Besides that, simple and multiple logistic regression test with significance level ($\alpha = 0,05$) is considered in order to determine the effect of the amount of urine volume at retention (RV), DWT, IPP on the incidence of BPH with urine retention and the success outcome of TWOC.
Result and Discussion

The study was conducted on 24 patients with acute urine retention due to BPH and underwent TWOC. Table 1 showed the data included urine volume during retention, mild muscle detrusor, IPP levels, and TWOC success indicators. The average age of the participants is about 64.5 year old ranging from 53 to 82 year old. The TWOC’s success was identified by 13 (54.2%) patients, while the remaining 11 (45.8%) patients were unsuccessful. Patients who succeeded TWOC had an average prostate volume (37.1 +/- 8.2 ml) which was significantly lower compared to patients who failed TWOC (61.9 +/- 25.5 ml). A significant difference between successful and failed TWOC groups is seen in the average thickness of detrusor muscles and grade IPP. Patients who succeeded TWOC had an average detrusor muscle thickness (1.8 +/- 0.3 mm) which was smaller compared to patients who failed TWOC (2.8 +/- 0.4 mm). For the IPP grade variable, patients who managed TWOC tended to have Grade 1 or 2 IPP, while patients who failed TWOC were more likely to have grade 3 IPP. The variable of initial urine volume when catheter was installed or urine volume during retention did not show any differences between successful and failed TWOC patients groups. The average initial urine volume when installed is 975 ml catheter which ranges from 400 ml to 2000 ml.

Table 1. Respondent’s characteristic

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (n=24)</th>
<th>TWOC</th>
<th>P-value *</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Success (n=13)</td>
<td>Fail (n=11)</td>
<td></td>
</tr>
<tr>
<td>Age (year old)</td>
<td>64.5 ± 7.5</td>
<td>62.5 ± 5.5</td>
<td>66.8 ± 9</td>
</tr>
<tr>
<td>LUTS history (months)</td>
<td>11.7 ± 7.1</td>
<td>12.5 ± 7.2</td>
<td>10.7 ± 7.2</td>
</tr>
<tr>
<td>AUR Duration (hours)</td>
<td>10.1 ± 5.3</td>
<td>9.9 ± 5</td>
<td>10.4 ± 5.9</td>
</tr>
<tr>
<td>Urine Retention Volume (RV) (ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 500 cc</td>
<td>3 (12.5%)</td>
<td>*</td>
<td>450 ± 70.71</td>
</tr>
<tr>
<td>&gt; 500 cc</td>
<td>21 (87.5%)</td>
<td>1025±445,94</td>
<td>1088,89±401,39</td>
</tr>
<tr>
<td>PSA (Age≤ 70 years old)**</td>
<td>3.3 ± 0.6</td>
<td>3.2 ± 0.6</td>
<td>3.3 ± 0.8</td>
</tr>
<tr>
<td>Prostate Volume (ml)</td>
<td>48.5 ± 21.8</td>
<td>37.1 ± 8.2</td>
<td>61.9 ± 25.5</td>
</tr>
<tr>
<td>Bladder volume during TAUS (ml)</td>
<td>200 ± 0</td>
<td>200 ± 0</td>
<td>200 ± 0</td>
</tr>
<tr>
<td>Detrusor Wall Thickness (DWT) (mm)</td>
<td>2.3 ± 0.6</td>
<td>1.8 ± 0.3</td>
<td>2.8 ± 0.4</td>
</tr>
<tr>
<td>IPP (mm)</td>
<td>10.3 ± 8.8</td>
<td>4.5 ± 2.4</td>
<td>17.1 ± 8.8</td>
</tr>
<tr>
<td>IPP Grade</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>8 (33.3%)</td>
<td>7 (53.8%)</td>
<td>1 (9.1%)</td>
</tr>
<tr>
<td>Grade 2</td>
<td>8 (33.3%)</td>
<td>6 (46.2%)</td>
<td>2 (18.2%)</td>
</tr>
<tr>
<td>Grade 3</td>
<td>8 (33.3%)</td>
<td>0 (0.0%)</td>
<td>8 (72.7%)</td>
</tr>
<tr>
<td>TWOC Success Indicator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous Micturition Post-TWOC</td>
<td>20 (83.3%)</td>
<td>13 (100%)</td>
<td>7 (63.6%)</td>
</tr>
<tr>
<td>Qmax (ml/s)**</td>
<td>9.1 ± 3.2</td>
<td>11 ± 0.9</td>
<td>5.5 ± 2.8</td>
</tr>
<tr>
<td>Voided Volume (ml)**</td>
<td>156.7 ± 73.8</td>
<td>191.5 ± 37.8</td>
<td>92.1 ± 83.2</td>
</tr>
<tr>
<td>Post Void Residual Urine (PVR) (ml)**</td>
<td>106.8 ± 73.7</td>
<td>72.6 ± 15.3</td>
<td>170.4 ± 97.4</td>
</tr>
</tbody>
</table>

* There is only one patient

** PSA is performed on patients up to 70 years of age (total n = 20, TWOC success n = 13, TWOC fails n = 7)

** Measurements were made in patients with spontaneous micturition post TWOC (total n = 20, successful TWOC n = 13, Failed TWOC n = 7)
a Statistical test to compare between TWOC successful groups and TWOC failed group using chi square for Grade and Micturition IPP variables and student t-tests for other variables.

The relationship between urine volume during retention and success of TWOC was tested by Spearman correlation test. The Spearman correlation test results are shown in Table 2. From the results of correlation test observed that the relationship between urine volume during retention and success of TWOC was not proven significantly. The correlation value with 0.158 and a significance level of 0.461 (p> 0.05).

Table 2. The results of the correlation test of urine volume during the retention and success of TWOC

<table>
<thead>
<tr>
<th>Success of TWOC</th>
<th>Correlation Coefficient</th>
<th>Urine volume during retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s Rho</td>
<td>1.000</td>
<td>0.158</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.461</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

The relationship between thickness of the detrusor muscle and success of the TWOC was tested by the Spearman correlation test. Spearman correlation test results were shown in Table 3. From the results of the correlation test it can be seen that the relationship between the thickness of the detrusor muscle and the success of TWOC is proven to be significant. This can be seen from the correlation value of -0.840 and a significance level of 0.000 (p <0.05). The number of correlations approaching one shows a strong relationship between the detrusor muscle thickness and the success of the TWOC. A negative correlation sign indicated that the increase in the thickness of the detrusor muscle, smaller the success rate of TWOC.

Table 3. The results of the correlation test of the detrusor muscle thickness and the success of TWOC

<table>
<thead>
<tr>
<th>Success of TWOC</th>
<th>Detrusor Muscle Thickness (DWT) Average (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s Rho</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>1000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-0.840**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>0.000</td>
</tr>
<tr>
<td>N</td>
<td>24</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

Based on Table 1, IPP in the group that succeeded TWOC was (4.5 +/- 2.4mm) while in the group that failed TWOC was (17.1 +/- 8.8mm). The average difference between the two groups was tested by t test and showed a significant difference (p <0.000). Comparisons between two groups were tested by the chi-square test and showed significant differences (p <0.001) as shown in Table 1. The relationship between Grade IPP and
TWOC success was tested by Spearman correlation test. Spearman correlation test results are shown in Table 4. From the results of the correlation test it can be seen that the relationship between Grade IPP and the success of TWOC is proven significantly. This can be seen from the correlation value of -0.717 and a significance level of 0.000 ($p < 0.05$). Correlation figures that approach one indicate a strong relationship between Grade IPP and TWOC success. A sign of a negative correlation indicated that increased in Grade IPP will decreased the success rate of TWOC.

**Table 4. The results of the correlation test of IPP Grading and success of TWOC**

<table>
<thead>
<tr>
<th>Spearman’s Rho</th>
<th>Success of TWOC</th>
<th>Grade IPP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>Success of TWOC</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td>-.717**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>24</td>
</tr>
<tr>
<td>Grade IPP</td>
<td>Correlation Coefficient</td>
<td>-0.717**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>24</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**

The results in this study indicated that Grade IPP can be used to predict the success of TWOC in patients with acute urine retention due to BPH. From the results of simple logistic regression showed the confidence interval value of the odds ratio is 0.008 to 0.497. This result showed that every 1 degree increase in the IPP grade will tend to have the odds of a maximum TWOC success of 50.3% lower or in other words any decrease in 1 IPP grade would increase the odds of success of the TWOC by 2.01 times.

A multiple logistic regression urine volume at retention, DWT, and IPP grade on the success of TWOC was conducted. The deviance value (-2 Log likelihood) model was very small below 0.000. The result indicated the occurrence of over dispersion / under dispersion so that the Wald test statistic becomes invalid. This is possible because of the interaction between independent variables or the existence of independent variables that are not mutually independent.

According to result of correlation test shown in Table 5, there was a close relationship between the variables DWT and Grade IPP. Thus, the model needs to be changed.

**Table 5: The correlation test of the DWT and Grading IPP**

<table>
<thead>
<tr>
<th>Spearman’s Rho</th>
<th>Detrusor Muscle Thickness (DWT) Average (mm)</th>
<th>IPP Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>Detrusor Muscle Thickness (DWT) Average (mm)</td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td>.649**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>24</td>
</tr>
<tr>
<td>IPP Grade</td>
<td>Correlation Coefficient</td>
<td>.649**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>24</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).**
From the results of multiple logistic regressions in Table 6 and Table 7, if separated between the variables DWT and Grade IPP it does not cause over dispersion. Wald test statistics concluded that DWT had a significant effect on success of TWOC with a significance level of 0.033 (p <0.05) and Grade and IPP significantly influence the success of TWOC with a significance level of 0.009 (p <0.05).

### Table 6: The correlation test of the urine volume during the retention and DWT

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>urine volume during the retention</td>
<td>1.332</td>
<td>6.593</td>
<td>.041</td>
<td>1</td>
<td>0.840</td>
<td>3.790</td>
</tr>
<tr>
<td>DWT</td>
<td>-8.592</td>
<td>4.202</td>
<td>4.539</td>
<td>1</td>
<td>.033</td>
<td>.000</td>
</tr>
<tr>
<td>Constant</td>
<td>18.923</td>
<td>11.150</td>
<td>2.880</td>
<td>1</td>
<td>.090</td>
<td>165311321.441</td>
</tr>
</tbody>
</table>

* Variable(s) entered on step 1: urine volume during the retention, DWT

### Table 7: The correlation test of the urine volume during the retention and IPP Grade

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>Df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>urine volume during the retention</td>
<td>.759</td>
<td>2.559</td>
<td>.088</td>
<td>1</td>
<td>.767</td>
<td>2.136</td>
</tr>
<tr>
<td>IPP Grade</td>
<td>-2.725</td>
<td>1.045</td>
<td>6.794</td>
<td>1</td>
<td>.009</td>
<td>.066</td>
</tr>
<tr>
<td>Constant</td>
<td>5.081</td>
<td>3.263</td>
<td>2.425</td>
<td>1</td>
<td>.119</td>
<td>160.873</td>
</tr>
</tbody>
</table>

* Variable(s) entered on step 1: urine volume during the retention, IPP Grade

This result suggested that prostate configuration such as IPP that described the medius lobe and/or lateral lobes of the prostate which protrudes into the bladder base, contributes to the occurrence of obstruction. So, the higher the degree of IPP, the heavier the degrees of obstruction, which will result a low success rate of TWOC.

**Conclusion**

In conclusion, the urine volume during retention could be used as a predictor to observe TWOC success. Based on the simple logistic regression analysis demonstrated that DWT and IPP degrees suitable to use as predictors of TWOC success. The IPP degree/grading had affected TWOC outcome where patients with grade 3 IPP had a low TWOC success rate are require for surgical procedures such as Transurethral resection of the prostate (TURP).

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Effectiveness of Virtual Reality Using PS4 Gaming Technology in Stroke Rehabilitation for Improving Upper Limb Function-A Pilot Study

Suresh J¹, Harish C²
¹Assistant Professor, ²BPT Student, SRM College of Physiotherapy, SRM Institute of Science and Technology, Kattankulathur-603203

Abstract

Background: Hemiparesis resulting in functional limitation of an upper extremity and lower limb is common among stroke survivors. Virtual reality is one of the way of improving motor function in stroke, limited evidence is available on the efficacy of virtual reality for stroke rehabilitation. Methods: In this pilot study 2 parallel groups involving stroke patients, we compared the feasibility, safety and efficacy of virtual reality using the sony PS4 gaming technology to evaluate upper limb motor improvement. The primary feasibility outcome was the total time receiving the intervention. The primary safety outcome was the proportion of patients experiencing intervention-related adverse events during the study period. Efficacy, a secondary outcome measure, was evaluated with wolf motor function test and Spasticity Grading at 4 weeks after intervention. OUTCOME MEASURE: WOLF Motor function test and Box and Block test. Result: This study shows that mean values obtained from WOLF motor function test showed no statistical significance and the mean values of Box and Block test showed statistical significance. Conclusion: This study concludes that the PS4 gaming technology is a feasible, safe, and potentially effective intervention to enhance motor function recovery in patients with a recent stroke.

Keywords: Virtual reality, PS4, wolf motor function test, Box and Block Test.

Introduction

Stroke is a devastating, serious and leading disease which causes disability and rehabilitation plays an important role in patients care. More than 80% of stroke victims experience hemiparesis immediately after the stroke of which 55-75% suffer from associated motor deficit and reducing the quality of life¹. Recent researches of neural plasticity and motor retraining suggests that repetitions of movement for multiple times plays a major role in regaining motor function. Jaron Lanier in the 1980s introduced Virtual Reality (VR). It consists of vital components such as external tools, internal tools, software and the database. The external tools (visual, auditory, and haptic), creates a virtual environment and allows the user to interact with it, and the internal tools (trackers, gloves, joysticks and exoskeletons, mouse), which tracks and senses position and motion of the user in a virtual environment and it connects the user to the virtual environment. In the field of motor rehabilitation, VR offers a convinient and affordable environment for rehabilitation, which makes way for the repetition of exercise effectively, evaluation of the effects, and provides motivation for maximum exercise repetition, which is the vital component in the field of rehabilitation³.

McComas et al. suggested that VR can be used for practicing new skills and learning of motor and cognitive functioning and to enhance their social participation and quality of life. It is a gaming technology which offers 3 dimensional virtual reality world, engaging the mirror-neuron system. The evaluation gaming industry has provided a variety of VR system like play station, xbox for home use, making it reasonably priced and also it can be easily modified according to the community needs. These technology allows bilateral observation.
of wonderful moments displayed on the monitor and combines the quality of increasing demands, required for the induction of neural plasticity.

Need for the Study

There are very few research involving the use of VR technology particularly the PS gaming console in the field of neuro-rehabilitation. There is an identified need for to establish the welfare, viability and efficiency of VR system as therapeutic option in stroke rehabilitation. The objective of this study is to examine the feasibility and safety of the PS4 gaming console compared with conventional physiotherapy in the facilitation of upperlimb motor function of the upper extremity required for activities of daily living among stroke patients.

Methodology

The study design was Experimental design, study type was experimental type, sampling method was convenient sampling and sample was 5, study setting was in and around Chennai. The participants 18-60 years of age having an ischemic or hemorrhagic stroke were included in the study. Participants involved in the study had acute stroke confirmed by the imaging and met a level of function of the upper extremity derived from the Chedoke-Mcmaster scale >3 in the arm at the time of enrollment. Participants were excluded who were medically unstable, or uncontrolled hypertension, severe illness, unstable angina, seizure and shoulder subluxation.

Procedure

The participants were selected based on the inclusion and exclusion criteria, the procedure was explained and the consent were taken to participate in the study. The participants were divided into two groups Group-A and Group-B. Group-A was treated with PS4 gaming session and conventional Physical Therapy and Group-B was treated with conventional Physical Therapy only. Participants received an intensive training program consisting of 12 interventional sessions of 60minutes each for a period of 4weeks. The arm movement involved in the use of PS4 included flexion and extension of shoulder(tennis), internal and external rotation of shoulder (tennis), elbow flexion and extension, forearm supination and pronation, flexion and extension of wrist as well as flexion of thumb involved in all activities. Participants were instructed to use their affected arm mainly in these activities in sitting position. There may be risk of photosensitive induced seizures to avoid these the patients were made to sit at a distance ≥6 feet away from the screen and lights were kept on.

Table 1. Pre and Post Test Values of Wolf Motor Function Test Group-A

<table>
<thead>
<tr>
<th>S.NO</th>
<th>MEAN</th>
<th>S.D.</th>
<th>T VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRE TEST FOREARM TO TABLE GROUP A</td>
<td>1.40</td>
<td>0.54</td>
<td>2.44</td>
</tr>
<tr>
<td></td>
<td>POST TEST FOREARM TO TABLE GA</td>
<td>2.00</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>PRE TEST FOREARM TO BOX A</td>
<td>1.20</td>
<td>0.44</td>
<td>2.44</td>
</tr>
<tr>
<td></td>
<td>POST TEST FOREARM TO BOX GA</td>
<td>1.80</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>PRE TEST ELBOW EXTENSION GA</td>
<td>2.00</td>
<td>0.70</td>
<td>4.00</td>
</tr>
<tr>
<td></td>
<td>POST TEST ELBOW EXTENSION GA</td>
<td>2.80</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>PRE TEST ELBOW EXTENSION (WEIGHT) GA</td>
<td>1.40</td>
<td>0.54</td>
<td>1.63</td>
</tr>
<tr>
<td></td>
<td>POST TEST ELBOW EXTENSION(WEIGHT) GA</td>
<td>1.80</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>PRE TEST HAND TO TABLE GA</td>
<td>2.00</td>
<td>0.70</td>
<td>2.44</td>
</tr>
<tr>
<td></td>
<td>POST TEST HAND TO TABLE GA</td>
<td>2.60</td>
<td>0.54</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>PRE TEST HAND TO BOX GA</td>
<td>1.40</td>
<td>0.54</td>
<td>2.44</td>
</tr>
<tr>
<td></td>
<td>POST TEST HAND TO BOX GA</td>
<td>2.00</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>PRE TEST GRIP STRENGTH GA</td>
<td>3.60</td>
<td>0.96</td>
<td>7.30</td>
</tr>
<tr>
<td></td>
<td>POST TEST GRIP STRENGTH GA</td>
<td>5.60</td>
<td>1.14</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Pre and Post Test Values of Wolf Motor Function Test Group-B

<table>
<thead>
<tr>
<th>S.NO</th>
<th>MEAN</th>
<th>S.D.</th>
<th>T VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.80</td>
<td>.44</td>
<td>6.32</td>
<td>0.003</td>
</tr>
<tr>
<td>2</td>
<td>1.80</td>
<td>.44</td>
<td>6.52</td>
<td>0.003</td>
</tr>
<tr>
<td>3</td>
<td>2.40</td>
<td>.54</td>
<td>6.53</td>
<td>0.003</td>
</tr>
<tr>
<td>4</td>
<td>1.80</td>
<td>.44</td>
<td>6.00</td>
<td>0.004</td>
</tr>
<tr>
<td>5</td>
<td>2.00</td>
<td>.70</td>
<td>6.53</td>
<td>0.003</td>
</tr>
<tr>
<td>6</td>
<td>2.00</td>
<td>.00</td>
<td>6.53</td>
<td>0.003</td>
</tr>
<tr>
<td>7</td>
<td>3.30</td>
<td>1.20</td>
<td>39.19</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 3. Post Test Comparison of Wolf Motor Function Test Between Group A and Group B

<table>
<thead>
<tr>
<th>S.NO</th>
<th>MEAN</th>
<th>S.D.</th>
<th>T VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.00</td>
<td>.70</td>
<td>4.81</td>
<td>.001</td>
</tr>
<tr>
<td>2</td>
<td>1.80</td>
<td>.44</td>
<td>5.06</td>
<td>.001</td>
</tr>
<tr>
<td>3</td>
<td>2.80</td>
<td>.83</td>
<td>3.20</td>
<td>.002</td>
</tr>
</tbody>
</table>
Table 4. Pre and Post Test Comparison of Box and Block Test Group-A

<table>
<thead>
<tr>
<th>S.NO</th>
<th>MEAN</th>
<th>S.D.</th>
<th>T VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRE TEST BOX AND BLOCK TEST GA</td>
<td>20.2</td>
<td>3.11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>POST TEST BOX AND BLOCK GA</td>
<td>25.2</td>
<td>3.7</td>
<td>-3.75</td>
</tr>
</tbody>
</table>

Table 5. Pre and Post Test Comparison of Box and Block Test Group-B

<table>
<thead>
<tr>
<th>S.NO</th>
<th>MEAN</th>
<th>S.D.</th>
<th>T VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PRE TEST BOX AND BLOCK TEST GB</td>
<td>22.6</td>
<td>4.39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>POST TEST BOX AND BLOCK GB</td>
<td>37.6</td>
<td>5.8</td>
<td>-7.31</td>
</tr>
</tbody>
</table>

Table 6. Post Test Comparison of Box and Block Test Group-A and Group-B

<table>
<thead>
<tr>
<th>S.NO</th>
<th>MEAN</th>
<th>S.D.</th>
<th>T VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>POST TEST BOX AND BLOCK TEST GA</td>
<td>25.2</td>
<td>3.7</td>
<td>-4.002</td>
</tr>
<tr>
<td>2</td>
<td>POST TEST BOX AND BLOCK GB</td>
<td>37.6</td>
<td>5.85</td>
<td></td>
</tr>
</tbody>
</table>
Results

According To Table 1: shows there was no statistically significant difference between pre and post test values of WOLF Motor Function Test among Group-A (P>0.05)

According To Table 2: shows there was statistical significance difference between pre and post test values of WOLF Motor Function Test among Group-B (P<0.05)

According To Table 3: shows there was statistical significance difference between post test values of Forearm to table, Forearm to box, Elbow extension, Hand to box (P<0.05). There was no statistical significance difference between post values of Elbow extension (weight), hand to table and grip strength (P>0.05)

According To Table 4: shows there is a significance statistical difference between pre and post test values of Box and Block Test values among Group-A.

According To Table 5: shows there was a statistical significance difference between pre and post test values of Box and Block Test (P<0.05)

According To Table 6: shows there was a statistical significance difference between post test values of Box and Block test among Group-A and Group-B (P<0.05)

Discussion

Nowadays the virtual reality technology is evolving in the stroke rehabilitation. The current paradigm of stroke rehabilitation strategy is to refine the motor function. Participation and maintaining a regular exercise has been regarded as the most important aspect in the field of stroke rehabilitation, there by preventing and halting the progression of the disease. Limited activities leads to disuse atrophy and decreased cardiovascular efficiency, which affects the functional gains, which is achieved during the rehabilitation. Virtual reality gaming technology allows the user to communicate with virtual environment and receives a feedback based on their real time performance. Limited evidence are available on VR gaming system in stroke rehabilitation, two recent systematic review reports focused in the lower extremity especially in gait training and very few studies are available in the upperlimb. Lnghorne. P, Coupar F, Pollack A. stated that the extent of VR system can support conventional therapy currently in use. The gaming and music are incorporating in the rehabilitation, it enhance enjoyment and the motivation and it also facilitate participation in the regular exercise. Heller et al. stated that hand strength is directly related to hand function. Sunderland et al. reported that hand strength improves according to the probability of complex motor task ability of the upper extremities and stated that hand strength is an important measure to indicate functional recovery in stroke. The result of the study shows that there is statistically significant difference in grip strength and box and block test between both the groups but when comparing both the groups, Group-B is highly significant than Group-A. Moreover several studies compared an intervention plus conventional physical therapy versus conventional physical therapy alone, which by necessity allowed for more rehabilitation time in the experimental group.

Conclusion

On seeing the result we can conclude that there is significant improvement in WOLF Motor Function Test and Box and Block Test in Group-B when compared to Group-A. The limitation of our study was a pilot study with small sample size, limiting any definitive conclusion about the efficacy of VR. This study was single blinded, it may subject to bias in those patients because of the use of new technology, that has been motivated them by the use of this treatment and also may have inadvertently disclosed their treatment allocation to the examiner.

Despite these limitation PS4 gaming technology is a feasible, safe, and potentially effective intervention to enhance motor function recovery in patients with a recent stroke.

Acknowledgement: My sincere thanks to Mr. J. Suresh. MPT. Associate professor for motivating and guiding me to do this research, MY hearty thanks to our coordinator Mrs.P.Ponmathi MPT Associate professor for the support, I would like to thank all my staff members and my friends and a parents for their support.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References

1. Nichols-Larsen DS, Clark PC, Zeringue A, Greenspan A, Blanton S. Factors influencing


Face Recognition and Gender Classification Using LBP

E.Ramakalaivani¹, T.S.Dharanidevi², A.Divya Priya², C.Kohila²
¹Assistant Professor, ²Student, Department of Computer Science and Engineering, Karpagam College of Engineering

Abstract

The identification of human beings is based on their physical body parts such as the face, eyes, nose, iris, ear, fingerprint, voice plays an important role in electronic applications and has become a popular area of research in image processing and in many face recognition related fields. Facial Expression Recognition (FER) is a decisive technology and a challenging task for human-computer interaction. Out of all the above-mentioned body parts, the face is one of the most popular traits because of its unique and differing features. In fact, individuals can process a face in a variety of ways to classify it by its identity, along with any numbers of other characteristics, such as gender, ethnicity, and age.

The classification has become prominent as a leading technique for problem solution and optimization. The classification has been used extensively in many problems that are controlled by a particular ruler or government. It is an area of great significance and has great potential for future research for future gender classification. It offers more than two but not many industrial applications in near future such as monitoring, surveillance, commercial profiling, and human-computer interaction. Many different methods have been proposed for gender classification like gait, iris and hand shape. However, the majority of techniques for gender classification are based on facial expression recognition. The proposed system uses skin tone extraction, facial feature exaction and feature extraction are done using LBP. Classification is done using Artificial Neural Network from that male and female is recognized.

Keywords: Facial Expression recognition, self-organizing map, Artificial neural network, artificial intelligence.

Introduction

Automatic analysis of data in video is a very challenging problem. It is used to a particular object in a video stream and automatically decides if it belongs to a particular class or not, one should utilize a number of different machine learning techniques and algorithms, solve object detection, tracking, and recognition tasks. The automatic human face and body parts recognition tasks differ. It is based on pattern recognition⁶ and artificial intelligence (AI).

Artificial Intelligence uses different biometric body parts, such as the face, fingerprint, gait, iris, and voice. Of all body parts, the face is one of the most popular distinguishing quality because of its unique features and impression among all other body parts. Using face recognition it can be performed without the cooperation and knowledge of the person being identified. Basically, recognizing a person becomes very difficult because of the variations in the poses, illumination, occultation, expression and so many. Using the human identification face is critical because it considers multiple parts of the facial structure, and the face of a person changes because it changes with the passage of time (time to time). In fact, individuals can categorize the faces in a variety of ways to show their identity, along with a number of other demographic characteristics, such as gender, ethnicity, and age. In particular, recognizing human gender is important because people respond differently depending to gender. In this, a successful gender classification approach can boost the performance by many other applications, including person face

DOI Number: 10.5958/0976-5506.2019.00895.7
recognition and tidy human–computer interfaces\(^4\). Face detection is disapproving comments to the final result in many applications, such as face processing (i.e., face, expression, gender classification, and gesture recognition), computer-human interaction, human crowd surveillance, biometrics, video surveillance, Artificial Intelligence, and content-based image retrieval. Facial expression recognition can be viewed as a preprocessing step for obtaining the object region. Recent researches are carried out for face detection by using a various color-based algorithm where the segmentation of skin-colored regions becomes robust only when a proper color model is picked out. Several color models exist on RGB(Red, Green, Blue), YCbCr(), and HSV (Hue, Saturation, Value) color models and each has a specific work field and strength. The RGB color space consists of the three primary color elements that make up white light: red, green, and blue. The RGB model makes easy to design of computer graphics systems but is not ideal for all applications. The YCbCr color space was defined in response to increasing demands for digital algorithms in handling video information and has since become a far apart used model in digital videos. Given that hue, saturation, and intensity (HSI) value are properties used to describe color, a corresponding color model, HSV, logically exists. When using the HSV color space, knowing what percentage of blue or green is required to produce a color is not needed; the hue is adjusted to get the desired color.

**Face Recognition Using BFGS**

The fact of being identified of human beings is based on their physical body parts, such as the face, fingerprint, gait, iris, and voice plays an important role in electronic applications and has become admired by many people, this area of research in image processing. FER is also one of the most successful applications of computer-human interaction and understanding. In these above-mentioned body parts, the face is one of the most popular a distinguishing quality because of its unique features. In fact, individuals can process a face in a variety of ways to classify our face by its identity, along with a number of other characteristics, such as gender, ethnicity, and age. Specifically, validity human gender is important because of human response differently according to gender. In this, we present a robust method that uses global geometry-based features to classify gender and identify age and human beings from video sequences\(^5\). The distinctive attributes are extracted based on face detection using skin color segmentation and the computed geometric features of the face ellipse region. These geometric features are used to form the face vector the path followed by it, which are put a data to a time delay neural network and are trained using the Broyden–Fletcher–Gold–Shanno (BFGS) function\(^6\). When using the HSV color space, knowing what percentage of blue or green is required to produce a color is not needed; the hue is adjusted to get the desired color\(^1\).

In facial feature extraction, unlike in natural methods applied to extract the features from image or video sequences: geometry-based, template-based, color-based segmentation and appearance-based methods. In this geometry-based method, it extracts features using geometric information, such as the relative positions and sizes of the facial components. This facial feature extraction method requires the classifier to use a large number of features. The techniques proposed to extract geometric features, such as left eye width, right eye width, nose width, left eye center to mouth left edges meet, right eye center to mouth right edges meet, left eye center to mouth right edges meet, and right eye center to mouth left edges meet, mouth left edges meet to middle of chin, and mouth right edges meet to middle of chin. This method proposed using geometric features, such as the distance between eyebrows to an eye, eyebrow to nose uppermost point, nose uppermost point to mouth, eye to mouth, left eye to right eye, nose width, and mouth width, all of which are removed using the Viola–Jones algorithm. And then this is applied as a combination of global and grid features. Worldwide features include inter-ocular distance, the distance between the lips to the nose tip, the distance between the nose tip to the line connecting the two eyes, the distance between lips to the line connecting two eyes, an eccentricity of the face, a ratio of dimension, and width of the lips\(^1\). Grid distinctive attribute includes skin color, mustache region, lip region, eye tail, forehead, eyelid, and nose wing of the face image. The pattern-based approach matches facial components to previously designed templates using an appropriate energy functional. The best match of a pattern in the facial image will yield the minimum energy; this approach can be many different due to the extensive computation involved and produce an intended result when query and model images have the same scale, orientation and illumination properties. Color-segmentation makes use of skin color to deal the face separately and any non-skin color region. In
this approach, the quality of the image coupled with lighting and hue plays an important role in image recognition and rate of classification. For a complicated background, face detection method on the skin color feature is identified. The pattern in the appearance-based method differs from the simple facial features, such as eyes and mouth, used in other approaches. Any extracted particular of the image refers to a feature. In methods such as principal component analysis (PCA), which was proposed by many applications, a face image is beentitled as a two-dimensional N by N array of intensity values or a vector of the dimension N2. The principal component analysis finds an M-dimensional subspace whose basis vectors correspond to the intensity as possible variance direction in the original image spaces. Introducing basis vectors define a subspace of face images called face space. All images of known faces are estimated onto the face space to find sets of weights that describe the contribution of each vector. The face can be identified through an equivalent set of weights for the unknown face and the sets of weights of known faces. It is applied as an adaptive pattern generation algorithm trained by means of the optimization procedure according to the LDA principle. Gabor wavelets were also used to extract the pattern vector. These approaches are commonly used for facial expression recognition rather than person identification. An applied Gabor filters at five scales and eight orientations for detecting skin regions. In this Fourier–Gabor filter was applied to extract features from the face images. In this not the same size, orientation, and scale values were adopted. Despite the prevailing circumstances of the above-mentioned methods, a variety of classification techniques can be used for recognition, such as decision trees, neural networks, nearest neighbours classifier (NNC), support vector machines (SVMs), Bayesian networks, fuzzy logic and genetic algorithms and many others useful algorithms. These are trained and tested three classifiers SVM, back propagation NNs (BPNNs), and KNN. These classifiers are then optimized through the GA (General Arrangement) using this, approach they got promising results in terms of the classification error rate and the minimization of computation time. This proposed a variant of the decision tree algorithm for gender classification of frontal images owing to its distinctive features. Their especially the execution is showed robustness and relative scale invariance for gender classification. This got high accuracy by using SVMs for gender classification. Many applications produced very promising recognition rates for three applications face recognition, facial expression recognition, and gender classification, and reasonable results in all databases with the same set of features and (NNC) classifiers. The system also had a real-time capability, and it was automatic. It is used an unsupervised learning technique to classify DCT-based feature vectors into groups and identify if the subject in the input image was present or not present in the image or video database. After training for approximately 850 epochs, the system achieved a recognition rate of 81.36% for 10 repeating trials. The main advantage of this execution is its high-speed processing capability and low computational requirements in terms of speed and memory utilization. In classification algorithm, PCA matrixes with different numbers of components (40, 50, and 60) were passed to the Neural Network, which conducted the framework with not same layer number, not same learning algorithms, and not same number of neurons in each layer, and achieved a high correct classification rate of approximately 83.5%. This is used as a posterior class probability and Artificial Neural Network is used to classify gender and age, respectively. The outcome achieved was 100% for face recognition, 98% for gender classification, and 94% for age classification. The recognition step was applied by SVM. A good concert of the gender classification test was also achieved on a relatively large-scale and low-resolution video database. In this FER applied the Artificial Neural Network for the face, facial expression, and gender classification, and produced reasonable results in all databases. This proposed system using SVM and presented the experimental results gained on a large image dataset. More than 90% accuracy of the viewer’s gender recognition and their classification was achieved. The social phenomena of a successful real-time gender classification depend greatly on the right choice of features and classification method. In the previous paper, an algorithm is introduced to enhance real-time gender classification. The face region is detected using skin color segmentation with HSV (HUE, SATURAION, VALUE) color space, and the features are extracted using global geometric properties. A Time Delay Neural Network (TDNN) algorithm is used for classification tasks and this implement for further gender classification.
The proposed system uses skin tone extraction, facial feature extraction, and feature extraction is done using LBP. Classification is done using Artificial Neural Network from that male and female is recognized.

**Block Diagram**

The steps of the proposed method can be summarized as follows:

1. Extract video frames.
2. Delete abnormal images from the start and the end manually.
3. Detect the face region from each frame using skin color segmentation.
4. Extract features from each image using the geometry based approach.

**Conclusion and Future Work**

A real-time classification system using TDNN is described according to Broyden Fletcher Goldfarb Shanno training algorithms and used for gender and age classification and human identification. This developed system implies that we can arrange gender, age, and human being with promising recognition rate by using global geometric features from video. It uses skin tone extraction, facial feature extraction, and feature extraction is done using LBP. Classification is done using Artificial...
Neural Network from that male and female is recognized.

The developed method based on worldwide geometric facial features achieves a high classification rate of 100% in the training set for all application, as well as 91.2% for gender classification, 88% for age arrangement, and 83% for human’s action in the testing set. Future work will be devoted to put into effect and examining the other features extracted from face parts by various with real-time application.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


18. Chuanxu, W. Face Separate into several parts Based on Skin Color in Complicated Background and its Sex Recognition. Journal of Software. 2011;1209-1216.

19. Dewi Agushinta, Adang Suhendra, Sarifuddin Madenda, Suryadi. Face Components action using


Description of the Severity of Dental Caries and Body Mass Index (BMI) among Elementary Students of Puskesmas Keputih Surabaya

Sesy Ayu Lestari1, Sylviani The Wirianto1, Merina Dwi Pangastuti1, Yovita Yonas1, Delaneira Alvita D.H.1, Irjinia Putri1, Dramawan Setijanto

1Faculty of Dental Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

Tooth caries or also known as tooth decay or cavities is one of the most common and widespread oral disease. However, this disease is also preventable if a good oral care and habits are practiced on daily basis since at the young age. Due to this, this study is conducted with the aim to identify the caries severity among the elementary pupils of Puskesmas Keputih. Random samples of 120 students were selected as the subject of study. Questionnaires, interviews and oral examination were done as means of data collection. The results had revealed that there were a few factors which increased the risk of caries development among the students. These factors are age, cariogenic food and drinks consumption, psychological and physical disorders, dental visits, toothache problems and lastly the behavior of mothers in handling their children’s toothache problems. In addition, the severity of caries when specified by Body Mass Index (BMI), the groups of subjects with a total number of DMF more than 5, tend to have BMIs with abnormal categories. Thus, in order to prevent and reduce cavities, a proper oral care needs to be taken since severe caries could contribute to poor body growth and BMI.

Keywords: Body Mass Index (BMI), Cariogenic Food, Dental Caries, Elementary Students

Introduction

Tooth decay or caries is one of the biggest problems faced by the people of Indonesia and other developing countries. Dental caries is considered a public health problem that is common throughout the world because of its high prevalence with significant social impacts1. The results of the 2013 Baseline Health Research (RISKESDAS) showed that the caries prevalence of the population in Indonesia was 72.6%, the dental and oral problem population of those who received treatment and medication was 31.1% and the tendency of the decayed, missing, filled tooth (DMF-T) index was 4.5. 2013 RISKESDAS data also showed that the DMF-T among 12-year-olds was 1.38, whereas World Health Organization (WHO) expected the targets for DMF-T by Global Goals for Oral Health 2020 to be less than one for the 12 years old children. The high prevalence of dental caries and unsuccessful attempts to overcome it are influenced by several factors including population distribution factors, environmental factors, behavioral factors and different dental health factors in Indonesian dental caries.

Dental caries can attack all people from toddlers to adults. Caries experience in the period of primary teeth is considered to affect permanent teeth later. In children, especially at the young age, the tooth structure includes the type of teeth mixed between milk teeth and permanent teeth, making them susceptible to dental caries2. Dental caries among children will cause pain, discomfort, sleeping difficulties at night and this can cause children to be absent from school. Children who experience caries do not always feel pain, but it is reflected on the changes in children’s eating and sleeping habits. The primary effect of caries is pain due to an infection. Nonetheless caries also has an effect on

Corresponding author:
Dramawan Setijanto
E-mail: r-darmawan-s@fkg.unair.ac.id
the general health of the child, one of which can occur due to abnormality of body weight since the presence of growth and development disorders\(^4\).

Puskesmas Keputih is located in Sukolilo Subdistrict and consists of 2 Sub-districts, namely Keputih Village and MedokanSemampir Village. Based on the preliminary survey conducted among 245 children from Keputih School and 100 children from MedokanSemampir, the mean of caries prevalence was found to be 89.5% and had a DMFT value of 5.42. Furthermore, 73.6% of the students with an abnormal BMI also experienced caries.

These results implied that high degree of DMF-T value which had an impact on BMI abnormalities and children’s lack of knowledge on dental and oral health as well as the participation of parents in maintaining a healthy teeth and mouth is a serious problem that must be immediately overcome and made as priority in solving the problem. Thus, this research intended to study the relationship between BMI and status of caries among primary school children in Puskesmas Keputih\(^3\).

**Methodology**

The type of research method used is observational descriptive research with cross sectional approach. This research was carried out in Keputih Elementary School and MedokanSemampir Elementary School, Surabaya in September 2017. The total populations in this study were all students from both schools in the 2017/2018 school year with a total of 821 students. Based on the population, using the simple random sampling technique, the calculation for the sample size for this study was 119. The equipment and materials utilized in this research were a) DMFT (WHO) examination sheet; b) Interview sheets and interview guidelines for subjects; c) Questionnaire sheets for parents; e) WHO Probes; f) Cotton and alcohol; and g) Gloves and masks.

The needed data and information for this research is gathered by means of questionnaires and interviews. The subject of study (students) answered the interview questions on the WHO questionnaire form relating to caries risk factors and questionnaire forms related to BMI supporting factors. This is followed by measuring body weight (kg) and height (cm) of the research subjects. Next, the researchers examined the condition of the oral cavity, namely the number of caries according to the WHO form using WHO probes. Lastly, questionnaire forms are distributed to the parents of the subjects to be filled up and collected the following day. Once all the distributed questionnaires are collected, the data is processed and cross-tabulated using the SPSS 17 application on several risk factors aforementioned.

**Result and Discussion**

In this study, cross tabulation analysis was made in the form of a 2x2 table. This is due to the small number of research subjects. The following is a cross tabulation between the risk factors of the impact of caries severity in Keputih and MedokanSemampir elementary schools on BMI.

Caries severity is measured through DMF-T values which are categorized into the DMF-T value is less than 5 and the DMF-T value is above 5. In Table 1, the result found that children with DMF-T values more than 5 tend to have a body abnormal mass index which is 76.5% of the total sample. P value obtained was 0.218 which showed no significant difference between caries severity and body mass index.

**Table 1. Distribution of BMI based on caries severity**

<table>
<thead>
<tr>
<th>Caries severity (DMFT value)</th>
<th>BMI</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
</tr>
<tr>
<td>≤5</td>
<td>5 (100%)</td>
<td>0 (0%)</td>
<td>5 (100%)</td>
</tr>
<tr>
<td>&gt;5</td>
<td>115 (100%)</td>
<td>115 (100%)</td>
<td>230 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>120 (100%)</td>
<td>120 (100%)</td>
<td>240 (100%)</td>
</tr>
</tbody>
</table>

An abnormal body mass index of the children is regrouped based on thin and fat bodies. From Table 2, the result showed that children with a DMF-T score of more than 5 tend to have a thin body mass index with a frequency of 78 children and a percentage of 94%.

**Table 2. Distribution of abnormal BMI based on caries severity**

<table>
<thead>
<tr>
<th>Caries severity (DMFT value)</th>
<th>BMI- Abnormal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thin</td>
<td>Fat</td>
</tr>
<tr>
<td>≤5</td>
<td>5 (6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>&gt;5</td>
<td>78 (94%)</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>83 (100%)</td>
<td>10 (100%)</td>
</tr>
</tbody>
</table>
Large food composition in one day is categorized into complete food composition and incomplete food composition. In Table 3, the results proved that children with large food composition in one day were incomplete and those with abnormal weight were 93 children with a percentage of 77.8%. P value was 0.9 which showed no meaningful results between the compositions of large food in one day with BMI. Cross tabulation between the compositions of large meals in one day with BMI has an odds ratio of 0.42.

**Table 3. Distribution of BMI based on food compositions**

<table>
<thead>
<tr>
<th>Food compositions</th>
<th>BMI</th>
<th>Total</th>
<th>P value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete</td>
<td>7 (23.3%)</td>
<td>23 (76.7%)</td>
<td>30 (100%)</td>
<td>0.9</td>
</tr>
<tr>
<td>Incomplete</td>
<td>20 (20.2%)</td>
<td>70 (77.8%)</td>
<td>90 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27 (22.5%)</td>
<td>93 (77.5%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

The amount of large meals in one day is categorized into a large number of three or more meals, and less than three times a day. In Table 4, the presented findings found those 16 children with large amounts of food less than three times a day, had abnormal weight. A p value of 0.445 was obtained which showed insignificant results between the number of large meals in one day and BMI. Cross tabulation between large meals in one day and BMI has an odds ratio of 0.79.

**Table 4. Distribution of BMI based on food compositions**

<table>
<thead>
<tr>
<th>Food intake</th>
<th>BMI</th>
<th>Total</th>
<th>P value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 3 times a day</td>
<td>24(23.3%)</td>
<td>77 (76.2%)</td>
<td>101(100%)</td>
<td>0.445</td>
</tr>
<tr>
<td>&gt; 3 times a day</td>
<td>3 (15.8 %)</td>
<td>16 (84.2%)</td>
<td>19 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27 (22.5%)</td>
<td>93 (77.5%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

The frequency of children eating snacks in one day is categorized into 3 times a day or less, and greater than 3 times a day. Table 5 showed that children who had snack frequency less than 3 times a day with an abnormal body mass index have the highest frequency of 59 children with a percentage of 78.7% of the total sample. P value was obtained for 0.693 which reflected no significant difference between frequency of eating snack and body mass index. Cross tabulation between BMI based on frequency of eating snacks in one day had an odds ratio of 0.40.

**Table 5. Distribution of BMI based on frequency of eating snacks in one day**

<table>
<thead>
<tr>
<th>Frequency of snack intake</th>
<th>BMI</th>
<th>Total</th>
<th>P value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 3 times a day</td>
<td>11(24.4%)</td>
<td>34(75.6%)</td>
<td>45(100%)</td>
<td>0.693</td>
</tr>
<tr>
<td>&gt; 3 times a day</td>
<td>16(21.3%)</td>
<td>59(78.7%)</td>
<td>75(100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27 (22.5%)</td>
<td>93 (77.5%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>
The duration of sleep in one day is grouped to sufficient (9-11 hours) and lack (less than 9 hours). In Table 6, the total number of the study subjects found that children with enough sleep duration in one day but had abnormal BMI values were 75 people with a percentage of 82.4%. P value was 0.024 which showed a significant difference between sleep duration and BMI. Cross tabulation between sleep duration in one day and BMI had an odds ratio of 0.022 which showed the difference between sleep duration in one day and BMI.

Table 6. Distribution of BMI based on sleep duration in one day

<table>
<thead>
<tr>
<th>Sleep duration</th>
<th>BMI</th>
<th>Total</th>
<th>P value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Abnormal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sufficient</td>
<td>16 (17.6%)</td>
<td>75 (82.4%)</td>
<td>91 (100%)</td>
<td>0.024</td>
</tr>
<tr>
<td>Lack</td>
<td>11 (37.9%)</td>
<td>18 (62.1%)</td>
<td>29 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27 (22.5%)</td>
<td>93 (77.5%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

In this study, there were no significant results between the severity of caries in the study subjects and the frequency of consumption of cariogenic foods and beverages. This is very likely to occur because caries is a multifactorial disease, meaning that many factors can cause caries. The children with good habits will immediately drink water after consuming cariogenic foods and drinks. This is very effective for caries prevention because it will reduce the attachment of foods containing sugar to the surface of the teeth.

Based on the results, the severity of dental caries among elementary school children in the work area of Puskesmas Keputih Community had no significant difference to the body mass index which can be seen from the P value greater than 0.05 and those with DMF-T values are more than 5 inclined to have an abnormal BMI. These results are consistent with the theory that children with dental caries have less weight since dental caries can cause extreme pain till the children tend to avoid hard foods and main meals. This condition can lead to weight loss and malnutrition. The absence of a significant difference between caries severity and body mass index was probably due to additional factors such as eating habits and duration of sleep in a day and physical activity after school.

Findings related to the frequency of eating snacks in one day did not have a significant difference to the body mass index which can be seen from the P value greater than 0.05. The children whose had frequency of snacking was less than three times a day but having a thin body, can be influenced by the type of snack. Most types of snacks that children often eat are snacks that are part of unhealthy food and lack of nutrients. Whereas children who have a frequency of eating snacks less than three times a day but having a fat body was probably due to the children’s tendency to eat the main or large food portion more often than snacks, so the calories obtained from large foods greatly affected the child’s weight.

Those children with incomplete large food composition in one day were and those with abnormal weight as many as 93 children with a percentage of 77.8% the P value was obtained at 0.9 which showed that there was no significant difference between the incomplete composition of large food in one day which with BMI. The composition of food eaten by children every day can affect a child’s weight, if the composition of foods that are eaten excessively or less which can cause weight to be abnormal (obesity or underweight). Multifactor that contribute to the occurrence of obesity are food intake (macro nutrients, fibre intake, breakfast intake, fast food consumption patterns, and consumption patterns of sweet foods / drinks); physical activity factors; psychological factors (self-esteem); and genetic factors.

In addition, 16 children ate large amounts of food (<3x in one day) and have abnormal weight. The P value was 0.445 which showed no significant difference between the number of large meals <3x in one day with BMI which was proven with the theory that to get enough energy, everyone should pay attention to
their diet by getting used to eating three times a day (morning, afternoon and evening) regularly. Especially the habit of eating breakfast is very important because our activities during the day need a lot of energy. Based on the research on eating behaviour of obese students, it was concluded that the main eating behaviour of 86% obese students were more 3 times a day and had a habit of adding portions of food at mealtime, eating their favourite food which was high in calories and low in fibre.

Based on the results of the study showed that the level of sleep duration in one day had a significant difference to the BMI with a P value less than 0.05 and the results obtained showed that 82.4% of the students despite having enough sleep in a day, still had abnormal BMI. This sleep disorder is judged by the way a person wakes up when he/she sleeps in the middle of the night or wakes up too early, wakes up to the bathroom, has difficulty breathing, coughs or snores loudly, feels cold or feels hot, experiences nightmares, feels sick and excuses others that disturb sleep. Sleep disturbances can cause hormonal changes in the body, one of which is growth hormone (GH). GH is secreted at the beginning of a period of deep sleep, stages 3 and 4 but is inhibited during sleep in the REM phase, which is related to dreams. GH is secreted during sleep, and three times more secreted than when awake. This hormone is also very instrumental in the child’s growth process, namely as a stimulator of cell growth and division in every part of the body and cartilage, improving the process of bone mineralization, increasing body protein synthesis, and stimulating insulin like growth factors that function in the growth and development of body cells. Lack of physical activity causes a lot of energy stored as fat, so that people who do less activity tend to be fat.

**Conclusion**

In the study the severity of caries in elementary school students in the work area of the Surabaya Puskesmas Keputih based on several risk factors measured using the DMF-T index had a total range of 0 to 15 with an average of 5 which according to WHO was categorized in high status. The severity of caries when specified by Body Mass Index (BMI), the groups of subjects with a total number of DMF more than 5, tend to have BMIs with abnormal categories. BMI with an abnormal category, if further specified did not have a significant difference between fat and thin.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Risk Factors in Severity of Dental Caries among Primary School Students of PUSKESMAS Keputih Surabaya

Sesy Ayu Lestari1, Sylviani The Wirianto1, Merina Dwi Pangastuti1, Yovita Yonas1, Delaneira Alvita D.H.1, Irjinia Putri1, Dramawan Setijanto1

1Faculty of Dental Medicine, Airlangga University, Surabaya 60115 Indonesia

Abstract

The study aimed was to determine risk factors in severity of dental caries among primary school students in working area of Keputeh Health Centre (Puskesmas). The study was used descriptive observational research with cross sectional approach. Besides, the study was conducted in September 2017 at primary school in working area of Keputih Health Centre (Puskesmas) included Keputih and MedampirSemampir primary schools. The population were all students who attended Keputih and Medoka primary schools. The sample sizes were 119 students who meet the inclusion criteria. The tool and material were DMFT (WHO) checklist sheet, interview guideline, questionnaire, mouthpiece, WHO probe, cotton, gloves, masks and study instrument. The questionnaire forms were distributed to respondent parents. The collected data were processed and cross-tabulated used SPSS software program. The result found, the students had higher risk of severity dental caries such as aged between 6 years old and 8 years old, those had experienced lower severity caries, those felt there was a psychological and physical disorder and visited dentist in past 12 months.

Keywords: Dental Caries, Cariogenic Food, Dental Visit, Brushing Teeth

Introduction

Dental caries is one most common dental and oral diseases in society which does not only occurs in adult but also in children. Dental caries affects 60-90% of school-age children and most of adult1. Dental caries is known as main cause of oral pain and tooth loss2. Besides, dental caries also defined as post-eruptive, localized, pathological process of external origin involving softening of hard tooth tissue which forms cavity3. Dental caries is progressive irreversible microbial disease which affecting tooth hard tissues4. Teeth are one part of body that functions to chew, speak and maintain face shape, thus it is important maintain dental health as early as possible so that teeth can long lasting in the oral cavity4.

The dental caries is strongly correlated with lifestyle included frequent in sugar consumption, less toothbrushing, lack of dental floss usage and less visiting a dentist regularly6. In Indonesia, dental caries is biggest problem faced by Indonesian which considered as public health problem with significant social impacts. Based on World Health Organization (WHO), developing countries have caries index of 1.2 which WHO target is 1.0.

High prevalence of dental caries and unsuccessful efforts to overcome dental caries among Indonesian are influenced by several factors such as population distribution, environment, different behavior factor and dental health factors7. Dental caries lead pain, discomfort, sleep difficulty among children which affects their life quality [2]. The children who suffering dental caries might not have tooth pain but can observe their changes in eating and sleeping habits. The primary effect is pain due to infection which results in abnormal weight because disruption of growth and development8. The study aimed was to determine risk factors in severity of dental caries among primary school students in working area of Keputeh Health Centre (Puskesmas).

Corresponding author:
Dramawan Setijanto
E-mail: r-darmawan-s@fkg.unair.ac.id

DOI Number: 10.5958/0976-5506.2019.00897.0
Methodology

The study was used descriptive observational research with cross sectional approach. Besides, the study was conducted in September 2017 at primary school in working area of Keputih Health Centre (Puskesmas) included Keputih and Medemampir Semampir primary schools. The population were all students who attended Keputih and Medoka primary schools. The sample sizes were 119 students who meet the inclusion criteria. The tool and material were DMFT (WHO) checklist sheet, interview guideline, questionnaire, mouthpiece, WHO probe, cotton, gloves, masks and study instrument.

In this study, DMF-T and def-t which aimed to determine dental caries status. The data needed from interviews. The oral cavity was examined according to WHO form used WHO probes. Meanwhile, the questionnaire forms were distributed to respondent parents. The collected data were processed and cross-tabulated used SPSS software program.

Result and Discussion

The age of the subjects is categorized into the age range 6-8 years and 9-13 years due to the age of primary school children generally aged 6-13 years. In Table 1, the number of study subjects aged 6-8 years who had a DMFT score > 5 of 89.1% and a group of 9-13 years of 100% had a DMFT score of > 5. P value was 0.004 which showed a significant result between age and severity of caries.

<table>
<thead>
<tr>
<th>Age</th>
<th>DMFT</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5</td>
<td>&gt;5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-8 years old</td>
<td>5 (10.9%)</td>
<td>41 (89.1%)</td>
<td>46 (100%)</td>
</tr>
<tr>
<td>9-13 years old</td>
<td>0 (0%)</td>
<td>74 (100%)</td>
<td>74 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>5 (4.2%)</td>
<td>115 (95.8%)</td>
<td>120 (100%)</td>
</tr>
</tbody>
</table>

A person’s self-assessment on dental and oral health is categorized into students’ assessment of their teeth and gums that are considered bad or good. In Table 2, the number of study subjects who had good self-assessment of teeth and gums with DMFT score > 5 (75 children) was greater than the group that had poor self-assessment of teeth and gums (40 children) of 93.8% of the total sample. P value was 0.106 which showed insignificant results between a person’s independent assessment of oral dental health and caries severity.

<table>
<thead>
<tr>
<th>Self-assessment of dental and oral health</th>
<th>DMFT</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤5</td>
<td>&gt;5</td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>5(6.3%)</td>
<td>75 (93.8%)</td>
<td>80 (100%)</td>
</tr>
<tr>
<td>Poor</td>
<td>0(0%)</td>
<td>40 (100%)</td>
<td>40 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>5 (4.2%)</td>
<td>115 (95.8%)</td>
<td>120 (100%)</td>
</tr>
</tbody>
</table>

The frequency of brushing teeth is categorized as twice a day or more, and less than twice a day. With reference to Table 3, the percentage of the results of the study subjects group who brushed their teeth less than twice a day has a DMFT score of more than 5 compared to those who brush their teeth more than twice a day at 98% of the total sample. P value obtained was 0.333 which reflected there were no significant results between the frequency of subjects brushing their teeth and the severity of caries. Cross tabulation between the
frequency of brushing teeth and the severity of caries had an odds ratio of 2.866.

Table 3. Distribution of Severity of Caries based on the frequency of brushing teeth in a day

<table>
<thead>
<tr>
<th>Frequency of brushing teeth</th>
<th>DMFT</th>
<th>Total</th>
<th>$P$ value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤5</td>
<td>&gt;5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 2 times a day</td>
<td>4 (5.6%)</td>
<td>67 (94.4%)</td>
<td>71 (100%)</td>
<td>0.333</td>
</tr>
<tr>
<td>&lt; 2 times a day</td>
<td>1 (2%)</td>
<td>48 (98%)</td>
<td>49 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5 (4.2%)</td>
<td>115 (95.8%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

Psychological disorders due to health problems of the teeth and mouth of the students are categorized into there are disorders (there are) or no interference. In Table 4, the number of study subjects who had physiological distress due to dental and oral health disorders had a DMFT score of > 5 (47 children) compared to groups that did not have psychological disorders due to dental and oral health (68 children) of 97.9% of the total sample. $P$ value obtained was 0.351 which showed insignificant results between psychological disorders due to dental and oral health and the severity of caries. Cross tabulation between psychological disorders due to dental and oral health and severity of caries had an odds ratio of 2.765.

Table 4. Distribution of Severity of Caries based on psychological disorders due to dental and oral health disorders

<table>
<thead>
<tr>
<th>Psychological disorders due to dental and oral health disorders</th>
<th>DMFT</th>
<th>Total</th>
<th>$P$ value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤5</td>
<td>&gt;5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>4 (5.6%)</td>
<td>68 (94.4%)</td>
<td>72 (100%)</td>
<td>0.351</td>
</tr>
<tr>
<td>Yes</td>
<td>1 (2%)</td>
<td>47 (97.9%)</td>
<td>48 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5 (4.2%)</td>
<td>115 (95.8%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

Physical disturbances due to health problems of the teeth and mouth are categorized into disruption (there is) or no interference. In Table 5, the results of the study implied that physical impairments due to dental and oral health disorders that had a DMFT score of more than 5 compared to the group that did not have physical impairment due to dental and oral health amounted to 96.2% of the total sample. $P$ value was obtained at 0.8 which showed insignificant results between physical disturbances due to dental and oral health and the severity of caries. Cross tabulation between physical disorders due to dental and oral health disorders and severity of caries has an odds ratio of 1.154.

Table 5. Distribution of Severity of Caries based on physical disorders due to dental and oral health disorders

<table>
<thead>
<tr>
<th>Physical disorders due to dental and oral health disorders</th>
<th>DMFT</th>
<th>Total</th>
<th>$P$ value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤5</td>
<td>&gt;5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3 (4.4%)</td>
<td>65 (95.6%)</td>
<td>68 (100%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Yes</td>
<td>2 (3.8%)</td>
<td>50 (96.2%)</td>
<td>52 (100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5 (4.2%)</td>
<td>115 (95.8%)</td>
<td>120 (100%)</td>
<td></td>
</tr>
</tbody>
</table>
Table 6 showed that students with a DMFT score of more than 5 with a dental visit at least once had the highest percentage (97.9%) of the total sample of students who had been to a dentist. P value of 0.370 was obtained which revealed no significant results between the frequency of visits to the dentist and the severity of caries. Cross tabulation between dental visit and severity of caries has an odds ratio of 0.375.

**Table 6. Distribution of Severity of Caries based on dental visit**

<table>
<thead>
<tr>
<th>Physical disorders due to dental and oral health disorders</th>
<th>DMFT ≤5</th>
<th>DMFT &gt;5</th>
<th>Total</th>
<th>P value</th>
<th>Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1(2.1%)</td>
<td>46(97.9%)</td>
<td>47 (100%)</td>
<td>0.370</td>
<td>0.375</td>
</tr>
<tr>
<td>No</td>
<td>4(5.5%)</td>
<td>69(94.5%)</td>
<td>73 (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5 (4.2%)</td>
<td>115 (95.8%)</td>
<td>120 (100%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

In this study assessment of caries severity among the public elementary school students of Puskesmas Keputih was done using a DMFT / deft measuring instrument which is an index of measurement of damaged dental caries (cavities). The severity of caries can be affected by several associated risk factors. The number of research subjects was 120 students. The data obtained in the study showed that the DMFT score was 5 and the median is 5, with 89.5% of children having caries.

Among children aged 6-8 years, the caries severity was higher than the 9-13 year old age group. In the cross tabulation, p value <0.05, where there was a significant relation between age and severity of caries. For the 6-8 years age group, 41 children had a DMFT score of >5. This was consistent with the theory that as the child ages, the child will have better knowledge in maintaining the cleanliness of his/her teeth and mouth. Lack of knowledge among children about dental health compared to adults affected them in cleaning their teeth.

Physical disorders when cross-tabulated with DMFT, 96.2% (with a significance test of p> 0.05 with odds ratio is 1.154) of the students had high caries severity that caused a mastication disorder and eventually absent from school due to dental pain. Dental caries that occur in children’s teeth will cause pain till the children will become lazy to eat whereby this can affect the BMI. Based on the odds ratio, it is illustrated that children who have physical impairments due to dental and oral health problems are at risk of 1.1 times to be affected by caries.

Psychological disorders such as embarrassment with the condition of his/her teeth when cross-tabulated with DMFT, was found that 97.9% with a significance test of p> 0.05 with an odds ratio of 2.765 that those suffering from high caries severity had a psychological disorder which caused the feeling of shame with his/her teeth. Oral health in children will affect the growth of teeth and jaw, speech function, aesthetics, acute infection, sleep disturbances, and severe caries at risk of taking longer breaks. From this study it can be justified that in groups with a higher number of dental caries experience (DMFT > 5) also agonized from a high psychological disorder of 97.9%.

Dental and oral health among children is an important factor that must be considered at early stage because tooth decay that occurs in the young age of children can affect the tooth growth at a later age. Besides that, childhood is the beginning of the formation of behaviour. Health behaviour is formed from several factors such as knowledge, attitudes, belief, physical environment, health facilities and infrastructure availability and health programs availability.

**Conclusion**

In conclusions, the students had higher risk of severity dental caries included aged between 6 years old and 8 years old, those had experienced lower severity caries, those felt there was a psychological and physical disorder and visited dentist in past 12 months.

**Ethical Clearance:** Taken from the committee

**Source of Funding:** Nil

**Conflict of Interest:** Nil
References


Medical Diagnosis using Machine Learning

Kiruba.J¹, Visalakshi.R², Vaishnavi.A², Ahalya.R², Keerthi.Ra²
¹Assistant Professor, ²Student, Department of CSE, Karpagam College of Engineering, Coimbatore-32

Abstract

Machine learning is one of the fast growing aspect in current world. Machine learning (ML) and Artificial neural network (ANN) are helpful in medical diagnostic task, detection and diagnosis of various disease. The information required for diagnosis is typically gathered from a history and physical examination of the person who is in need of medical care. The aim of this paper to examine the applications of machine learning and artificial neural network in medical and data science field. In specific, we have chosen the disease dengue. This targets on dengue fever prediction, symptoms of a patient, using a data mining tool for the accurateness. Climate change is the main cause of dengue. There is a need for active input from health sector to ensure development and prevention about local and global environment.

Keywords: Machine Learning, Artificial Neural Network, Dengue, Health Sector

Introduction

Contrary of dengue infection has increased since early 1940’s. This is due to increase in population growth, ineffective mosquito control, climatic change³. Today, approximately 45% of people live in regions of the world where they have the risk of getting affected by dengue. The dengue virus spread easily by transmitting to humans via a small bite of an infected mosquito⁴. When a mosquito bites a person who is already affected by dengue in his or her blood, mosquito becomes infected with a dengue virus. Dengue cannot be spread directly from one to one, mosquitoes are needed for transmission of the dengue virus.

Artificial Neural Networks

An artificial neural network attempts to account for the parallel nature of human brain. An (ANN) is high network of interconnecting processing elements. Subgroup of processing element is called as layer. The input layer is first layer and output layer is last layer. Between input layer and output layer there is also a hidden layers. Medical diagnosis using (ANN) is a very active research in medical field. By the classification Artificial neural networks classified into categories such as supervised and unsupervised. In supervised, network is trained by its own input and output while unsupervised is as self-organizing map and provided only with its input. The network needs to develop its own input stimuli. The self-organization by clustering input is to inherent the problem description⁴.

Creating the database

In the process of creating the database for neural network it needs idea that clinical status of patients. The data which contain inaccurate information about the patient cannot be used. Often these days basic information
about the patient, results of biochemical analysis and symptoms to detect the correct disease. Database should contain sufficient amount of details about the patients and reliable patterns which characterize the diagnosis. This will enable you the training process of neural network in data science and to used to generalize patient’s diagnostics4. The database structure has a form of table or matrix containing information about patient’s health condition and their diagnosis.

MLP NETWORK STRUCTURE FOR DISEASE CLASSIFICATION

Initial idea of medical diagnosis with MLP to be used in hidden layer and output layer. Inputs are represented as medical parameters in medical field. Hidden neurons are experimented and evaluated successfully. If hidden neurons are large and its able to generalize. Details of patient’s diagnosis are applied to MLP. And it is suitable to training, testing, evaluation and validation.

Case Study about dengue disease

The dengue virus is spreading everywhere through a mosquito-to-mosquito-to-human cycle of transmission2. After 3-5 days being bit by mosquito, a person gets infected. Aedes aegypti develops vitamin, where there is a possibility of high level dengue virus in blood level. Mosquitoes have a difficult life cycle. Aedes aegypti is the primary vector. Dengue have the great risk in high population areas6.

Aedes aegypti principal vector of dengue disease is seen between the latitudes 35°N and 35°S. The annual case of dengue fever in South East Asia is found to be 200000 in 90s6. Dengue virus antigen can be found in different tissues of our body but it is mainly found in liver and reticuloendothelial system2. Travellers travelling to endemic areas are found to be affected by dengue disease. Travellers are advised to protect themselves from mosquito bites while travelling to endemic areas. During genotype cycle the mosquito takes more than one meal blood. Dengue epidemics are happened during the warm, rainy and humid season which is favor for the mosquito.

Figure 2. MLP Network Structure

Figure 3.1. Case study

Clinical diagnosis and Features

Clinical diagnosis may vary based on the age of the patient and clinical in apparent infections. Clinical in apparent infection is classified into five different types: Classic dengue, dengue haemorrhagic fever, febrile illness, dengue shock syndrome and other syndromes such as fulminant liver failure and encephalopathy. Dengue is seen more commonly among adults and older children compared to school children (children under 15 years). The symptoms are: Headache, High fever, vomiting and nausea.

Diagnosis using Neural Networks

The Artificial neural networks (ANN) have distinct advantages over statistical classification methods. The ANNs are suitable in cases, where traditional classification methods fail, because of noisy or incomplete data. Neural networks also benefit in multivariable classification problems with a high correlation degree in medical diagnosis. Based on the generalized model, we
can then classify input patterns based on symptoms of diseases. The disease diagnostics process can be divided into training and diagnostic part. The neural network is trained using database. The patient’s data are processed by the neural network which is determined by the probable diagnosis methods. The final diagnosis is the result of physicians decision who evaluates all aspects of the disease and results in neural network classification.

Figure 4. Training & Diagnosis

Surveillance of vector borne disease

There are several surveillance for different type of vector borne disease. But early warning systems are not yet found due to the environmental factors, dynamic and complex nature of the disease. Early warning system includes targeting surveillance, detecting potential threat and control methods3. To create early warning system using information like environmental, climate, host and vector through different process such as mathematical modeling and geographical information system been used to enhance surveillance system.

Overview of ANNs in medical Diagnosis

There are many reviews about the application of ANNs in medical field. The general application of ANNs is of data and diagnostic classification of patient’s with uninvestigated dyspepsia in gastroenterology and in search of biomarkers. The amount of data coming from instrumental and clinical analysis of these diseases quite large. So that development of tools to facilitate diagnosis is of great relevance.

Dengue disease

The clinical features of dengue vary with the age of patient. It can be classified into five presentations: non-specific febrile illness, classic dengue, dengue haemorrhagic fever, dengue haemorrhagic fever with dengue shock syndrome and other unusual syndromes such as encephalopathy and fulminant liver failure.

Classic dengue is more commonly seen among children and adults. Dengue is abrupt in onset, typically with high fever accompanied by severe head ache. Recovery may be prolonged and include depression. Dengue haemorrhagic fever is primarily a disease children under 15 years in hyperendemic areas. The disease is characterized by increased capillary permeability and haemostatic changes. Enlargement and tenderness of the liver has been reported in up to 50% of patient’s. Mortality can be high as 20-30% without early appropriate treatment, but it is as slow as 0.5% in hospitals with staff experienced in the disease. Warnings that dengue syndrome include vomiting, abdominal pain, level of consciousness and fever to hypothermia and decrease platelet count1.

Figure 5. Classification

Cancer

According to the survey, there will be more than 2 million newly diagnosed cases of cancer in US. Diagnosis is essential for the clinical management of cancer including more suitable therapeutic approach. The application of neural networks on defined data sets was evaluated in 1994 for cancer. Moreover, advanced analytical method, mass spectrometry can offer suitable information for clinical relevant ANN analysis. This technique has been applied successfully in the diagnosis of cancer. The integrated feed-forward ANN classifier showed an overall sensitivity of 98% and a specificity of 96% in medical field. Therefore ANNs have been used in various primary data, ranging from clinical parameters to bio-chemical values and provide increased diagnostic accuracy for various kinds of cancers.
Diabetes

It represents a serious health issue in developed countries. The most common kind of diabetes is type II, in which cellular response to insulin is impaired leading to disruption of tissue homeostasis and hyperglycemia. The ANNs extrapolate glucose concentrations from spectroscopy to monitor glucose level. For this particular purpose biological variables such as age, weight, gender fasting plasma glucose where used as input data. Results were compared with those from traditional statistical methods. As a control strategy trajanoski and colleagues combined ANNs and non-linear model predicted controlled. A sensitivity of 79.30 and specificity of 60.53% was actually, better values than those obtained using other approaches such as statistical method³.

Overall Analysis of Dengue Prediction

Figure 6. Overall Analysis of dengue

Conclusion

Dengue is a most threatening disease caused by mosquitoes. In our research work and dengue disease prediction is done using ANN in medical diagnosis¹. ANNs represent a powerful tool to help physician perform diagnosis and other enforcements. ANNs have proved to be suitable for satisfactory diagnosis of various diseases. Methods of summarizing and elaborating and intelligent data and on informative data are continuously and can contribute greatly to effective, precise and swift medical diagnosis. ANN shows significant results in dealing with data represented in symptoms. Thus, the results demonstrate the effectiveness of proposed system⁵.

Ethical Clearance: Taken from the committee

Source of Funding: Nil

Conflict of Interest: Nil

References


A Study on Relationship between Internet Usage and Anxiety among Primary School Students

Mohd Rustam Mohd Rameli¹, Loh Shu Wen² & Najua Syuhada Ahmad Alhassora¹, Mohamad Rasidi Pairan³

¹Senior Lecturer, ²Master Student, School of Education, Universiti Teknologi Malaysia, Malaysia

Abstract

The main objective of this study was to investigate the difference in internet usage and the anxiety level of Chinese primary school students in Johor Bahru, Malaysia across gender. The study was also carried out to identify the correlation between the internet usage and anxiety level among students. A total number of 396 primary school students from the Chinese primary schools in Johor Bahru, Malaysia have been involved in this study who are sampled by using stratified simple random sampling technique. From the study, it was found that excessive internet usage could occur in students of any gender depending on their patterns, purposes or motivations of using internet. However, male students tended to involve in excessive internet usage. There was no significance difference between the mean of total Internet Addiction Test (IAT) score of male and female students. There was a significance difference between the mean of total and Child Anxiety Symptom Checklist (CASC) score of male and female students. Female students tended to be troubled by the anxiety symptoms. Internet usage could predict the prevalence of anxiety problem although the correlation was weak. The findings of the study are to create awareness among parents, teachers, schools and community regarding the issue of excessive internet usage and anxiety in children, as well as to enrich the current empirical research data and theoretical evidence in Malaysia especially for primary school students.

Keywords: Internet usage, anxiety, correlation, primary school students

Background of Study

In Malaysia, there is 76.9% of Internet users reported in 2016 according to a survey administrated by MCMC CATI Centre in Cyberjaya ¹. The survey found that 83.2% of children aged between 5 and 17 are Internet users ¹. Most of the children spend their time online in text communication, social networking, online gaming, searching tools and videos viewing ¹,². As children grow up, the purposes of using Internet will also be varied and expanded³,⁴. Some students, especially children, spend plenty of time on using Internet because they gain more satisfaction on Internet compared to their daily real life⁵. This scenario is not a good sign and should be highly concerned by parents or caregivers.

In Malaysia, a study has been carried out by Ke, Wong and Marsh⁶ on the problematic Internet usage among university students. The results showed that majority of the students (57.5%) were having moderate Internet addiction and most of them were addicted to the social networking sites (SNS). These students on the other hand showed the symptoms and behaviours of having depression, anxiety and stress problems. The research also examined on the relationship between pathological Internet usage and mental health and the findings showed that there was a significant, positive correlation⁶. The more addicted the university students in using Internet, the greater the tendency of developing mental health problems such as depression, anxiety and stress⁵,⁶,⁷,⁸.

Excessive Internet usage which causes Internet addiction can result in emotional instability that leads to tension, anxiety or depression ²,⁷,⁸. Internet users who have addicted to Internet are most likely to have
emotional instability where the Internet addiction has shown negative impact as well as disturbance on their mood, tolerance, patience and judgment. They have higher risk of suffering from psychological problems including stress and loneliness which eventually could affect academic performance or lead to cyber bully.

According to the study of Gholamian, Shahnazi and Hassanzadeh, younger generations such as children and adolescents are more prone to excessive Internet usage or Internet addiction and problems caused by the following issue such as anxiety, stress and depression. Children are believed that they are lack of skills and not capable yet to cope with the inappropriate content online, cyber bully and online scam. Long-term exposure to the negative issues from Internet might cause emotional disturbance to them.

The prevalence of Internet addiction is higher in males than females according to most studies, while some show higher rate in females. The differences between male and female in Internet addiction resulted from the patterns, motivations, or purposes of using Internet. On the other hand, the gender difference of the prevalence of anxiety disorder showed that females were usually reported to have higher prevalence of anxiety disorder than males at a younger age of onset. For elder age, females were more easily influenced than males in terms of emotion and they showed higher rate in fear extinction compared to males. According to Lebron and Milad, the anxiety-related neurotransmitter systems and fear extinction are significantly affected by the female gonadal hormones such as oestrogen and progesterone. In contrast, testosterone, the male gonadal hormone, has been found to have the function of reducing anxiety by reducing the reaction of stress. Therefore, the gonadal hormones of females are likely to play a role in increasing the prevalence and severity of anxiety disorders in females.

Research on the impact of excessive Internet usage has been carried out in many countries but lack in Malaysia. Most research regarding the following issue studied on adolescents or students of age above 16 but less in students of age 12 or below. Therefore, further study on this area should be conducted to improve the current empirical research in children.

**Research Objectives**

The main objective of the study is to investigate the relationship between Internet usage and the anxiety level of Chinese primary school students in Johor Bahru. Besides, this study will also investigate the difference in internet usage and anxiety between male and female students.

**Methodology**

The research design of this study takes the form of the quantitative research approach. Statistical analysis of numerical data was done to deduct a conclusion to explain the issue. This research study was administered in 17 Chinese primary schools in Johor Bahru district of Johor state. This research applied stratified simple random sampling to determine the population samples. 386 students of Year 4 to Year 6 from the Chinese primary schools in Johor Bahru district had been randomly selected as the samples of the study.

The survey contained three sections, Section A for demographic background and related information, Section B for Internet Addiction Test (IAT) and Section C for Child Anxiety Symptom Checklist (CASC). The instruments used in this study were adopted from other researchers and had been modified by the researcher according to the cognitive level of the respondents. The constructs that were measured by IAT included salience, excessive use, neglect work, lack of control and lack of social life. The CASC measured the following constructs including generalized anxiety disorder, social anxiety, panic attacks or panic disorder, separation anxiety, specific phobia, emetophobia or fear of throwing up and obsessive-compulsive disorder. Pilot test was carried out on a group of Chinese primary students to measure the validity and reliability of the instruments. Both IAT and CASC showed high reliability, in which the Cronbach’s alpha showed 0.81 and 0.88 respectively. The items in the instruments had been revised for better reliability and validity purpose. All items in the IAT were accepted and remained, while only 32 items were included in the CASC after revising. The instrument IAT and CASC both based on Likert-like scale of 4 points. The total score of the scale were analysed to determine the level of Internet addiction and anxiety symptom the students have.

**Findings**

Table 1 showed the test statistics for the total IAT score of male and female primary school students. The significant value, .093, was greater than the alpha value,
.05, thus failed to reject the null hypothesis. There was no significance difference between the mean of total IAT score of male and female students (z = -1.682, p = .093). The results suggested that there was no significant difference in Internet usage between male and female students.

Table 1: Test Statistics for the total IAT score of male and female primary school students

<table>
<thead>
<tr>
<th></th>
<th>IAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>16782.500</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>35503.500</td>
</tr>
<tr>
<td>Z</td>
<td>-1.682</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.093</td>
</tr>
</tbody>
</table>

Table 2 showed the test statistics for the total CASC score between male and female students. The significant value, .000, was less than the alpha value, .05, thus rejected the null hypothesis. There was a significance difference between the mean of total CASC score of male and female students (z = -3.983, p = .000). The results suggested that there was a significant difference in level of anxiety symptom between male and female students.

Table 2: Test Statistics for the total CASC score of male and female primary school students

<table>
<thead>
<tr>
<th></th>
<th>CASC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>14261.00</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>32982.00</td>
</tr>
<tr>
<td>Z</td>
<td>-3.983</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 3 presented the correlation between the total scores of IAT and CASC. There were 386 respondents (N) in each condition. The correlation coefficient was .160. This meant that the correlation between the total scores of IAT and CASC showed weak correlation. The significant value of the correlation between the total scores of IAT and CASC was .002, was lower than the alpha value, .05. Thus, the tests rejected the null hypothesis. There was a significant difference between the correlation of the Internet usage and the level of anxiety symptom among students (r = 0.160, p = 0.002). The result suggested that there was a weak, yet positive correlation between the Internet usage and the level of anxiety symptom among students.

Table 3: Correlation between the total scores of IAT and CASC

<table>
<thead>
<tr>
<th></th>
<th>IAT</th>
<th>CASC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation Coefficient</td>
<td>.160*</td>
<td></td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>386</td>
<td></td>
</tr>
</tbody>
</table>

Note: **Correlation is significant at the 0.01 level (2-tailed).

Discussion

According to the findings, there was no significant difference in Internet usage between male and female primary school students. The findings showed that male students had higher prevalence of excessive Internet usage than female students as supported by several past studies. This might be due to the low self-controllability of male students in using Internet in which they were more likely to involve in excessive usage of Internet than female students. This study had proven that excessive Internet usage did not necessarily occur in specific gender because there was no significant difference in Internet usage between male and female students. The gender gaps in accessing Internet had been reducing as Internet access at home and school were becoming more common. Both male and female students might show equivalence of Internet usage but the patterns, purposes or motivations of using Internet would be different as supported by Mok and MCMC.
The results suggested that there was a significant difference in level of anxiety symptom between male and female primary school students. The findings showed that female students had higher prevalence of anxiety problem than male students. According to most studies, females were usually found to have higher prevalence of anxiety disorder than males at a younger age\textsuperscript{13-14}. This was probably because females were easier to be influenced than males in terms of emotion due to the gonadal hormones of females in increasing the prevalence and severity of anxiety disorders in females\textsuperscript{15-16}. Females showed fear extinction more easily compared to males\textsuperscript{15}. In contrast, male gonadal hormone was reported to have the function of reducing anxiety by reducing the reaction of stress\textsuperscript{17}. Furthermore, females were more protected by their parents since young age. Therefore, the parenting style of protecting female children physically had increased their feeling of vulnerability\textsuperscript{20}. Male children would be encouraged and praised for their assertiveness and independent more than female children and that gave the males stronger sense of security that they had control over the environment\textsuperscript{20}.

The findings showed that there was a weak, positive correlation between the Internet usage and the level of anxiety symptom among Chinese primary school students in Johor Bahru. There was a positive correlation between the Internet usage and the level of anxiety symptom among primary school students. Hence, Internet usage level of students was able to predict the prevalence of anxiety symptom among them. The correlation was weak as primary school students were less likely to suffer from anxiety problems due to the protective parenting for children at age below 12\textsuperscript{21}. Furthermore, the Internet usage level of students in the study was in average level and that did not precisely predict the prevalence of anxiety problems as followed by the influence of excessive Internet usage.

**Conclusion**

This study focused on the relationship between Internet usage and anxiety among Chinese primary school students in Johor Bahru. It was found that excessive Internet usage could occur in students of any gender as there was no significance difference in Internet usage between male and female students. However, male students showed slightly higher tendency of excessive Internet usage probably due to their lower self-control than females\textsuperscript{18}. Furthermore, female students had higher tendency to be troubled by the anxiety symptoms most probably due to the female gonadal hormones that stimulated the prevalence of anxiety feeling and the overprotecting parenting style that might cause them to be more vulnerable to fear and anxiety\textsuperscript{19,20}. There was a weak, positive correlation between the Internet usage and the anxiety symptom among students in this study. Internet usage of an individual could predict the prevalence of anxiety problem in that individual, although the correlation was weak. It was believed that primary school students were less likely to suffer from anxiety problems due to the protective parenting for children at age below 12\textsuperscript{21}. There were also some implications to enrich the current theoretical evidence in Malaysia and for authorities in concern with the issues. Several recommendations had been suggested for future studies in order to enrich the empirical research data in Malaysia, especially for students of age below 12.

**Source of Funding** : Fundamental Research Grant Scheme (Vot. No. R.J130000.7853.5F039).

**Conflict of Interest** - No

**Ethical Clearance** - Obtained from Ministry of Higher Education, Malaysia

**References**

5. Shen CX, Liu RDe, Wang D. Why are children attracted to the Internet? The role of need satisfaction perceived online and perceived in daily real life.


Knowledge and Misconceptions regarding Hand Washing as Perceived by the Food Handlers in School Foodservice Operations

Nornazira Suhairom¹, Mohd Zolkifli Abd Hamid¹, Ahmad Nabil Md Nasir², Dayana Farzeeha Ali², Muhammad Khair Nordin², Hanifah Jambari², Nur Hazirah Noh@Seth²

¹Senior Lecturer, School of Education, Faculty of Social Science and Humanities, Universiti Teknologi Malaysia, Johor, Malaysia, ²Senior Lecturer, School of Education, Faculty of Social Science and Humanities, Universiti Teknologi Malaysia, Johor, Malaysia

Abstract

The rising issue of food borne diseases due to unhygienic food preparation is burgeoning in our society. The risk of food contamination largely depends on the hygiene practices of food handlers. However, previous studies had shown that hand hygiene practices is often neglected by the food handlers. This study sought to evaluate the perceived hand washing knowledge among food handlers with reference to the proper hand washing procedure as well as the knowledge on appropriate times to wash hands. The study sample is comprised of 146 food handlers who were selected by means of random cluster sampling. The questionnaire used was adapted from previous studies on hand washing. Data were analyzed using descriptive statistics. Findings revealed that hand washing knowledge scores among food handlers were high where 84.9% respondents had good knowledge with score ≥ 70%, 14.4% respondents had satisfactory knowledge with score range of 50 to 69%. Only one respondent had a poor knowledge of hand washing (score below 50%). However, outcome from the study also indicated that there are some misconceptions concerning proper hand washing practices and appropriate times to wash hands. Thus, leads to a conclusion that although food handlers had knowledge of how and when to wash hands, some of them shows that they had a misconception of a certain facts on hand washing.

Keywords: Hand washing, food handlers, school food service.

Introduction

Hand washing is well-known as an important routine to prevent food-borne diseases and cross-contamination from hands to foods. Previous studies had shown that inadequate hand washing by food workers is one of the factors that contribute to the food-borne disease outbreaks in retail food establishments. Previous study proposed that there are two factors which influence microbiological contamination in foods which are poor status of hygiene and poor food handling practices¹. Currently, the importance of food handlers’ hand washing behaviour has prompted a number of studies investigating their knowledge, attitudes and practices of hand washing²⁻⁵. The community was well aware of the unhygienic practices and diseases associated with them, but they failed to apply the principles of hygiene in daily lives⁶. A study on food safety knowledge among food workers found that respondents who were certified in food safety had higher knowledge test scores than those employees who were not certified⁷. Food handling training and education should be targeted to both managers and food workers. Operations with food safety certified personnel practiced a greater number of appropriate food safety practices than those without a certified employee. Knowledge could contribute to the changes in attitude. Realizing the importance of

Corresponding author:
Nornazira Suhairom
Senior Lecturer, School of Education, Faculty of Social Science and Humanities, Universiti Teknologi Malaysia, Johor, Malaysia. Email: p-nazira@utm.my

DOI Number: 10.5958/0976-5506.2019.00900.8
knowledge, other researches in this area also sought to measure knowledge towards hand hygiene. However, evidence also shows that high level of food-related knowledge was not an assurance of good food handling practices. Some studies had proven that food handler’s practices during food preparation process were not always consistent with the accepted standards.

There is a need to explore in-depth factors associated with training effectiveness because training that emphasizes in knowledge acquisition does increases the knowledge level regarding food safety. However, it does not always result in a positive change in food handlers’ behaviour. The results were similar to the various studies on food safety behaviours which indicate that knowledge solely will not ensure compliance to standard food hygiene practices although it is one of the necessary components of behaviour change. Hand washing is often being neglected in actual food handling practices as supported in a study where the authors found negligence as one factor among food workers. Food handlers’ training that emphasized on food hygiene and safety supposed to be one of the best strategies in increasing awareness among food handlers. Nonetheless, the findings from past researches imply that some food handlers who had attended food hygiene educational courses or training may not have understood the real aim of the training. Therefore, prompt action should be taken to encounter these discrepancies. The current study seeks to identify the perceived hand washing knowledge among food handlers in the school food service operations with reference to the proper hand washing procedure and appropriate times to wash hands at workplace.

Method

The sample included 146 food handlers in hostels kitchen from two types of boarding schools in Peninsular Malaysia. A cluster-stratified random sampling method was applied to select the sample from the selected schools. The knowledge assessment instrument was developed using references from the Malaysia Ministry of Health (Food Hygiene and Food Safety Guidelines) and past studies. Frequency analyses were applied to determine respondents’ response on each of the statements in the questionnaire. Knowledge section consisted of 19 statements covering aspects of knowledge about the proper procedure to wash hands and the appropriate times to wash hands. Respondents were asked to choose from among three options – true, false or do not know. A “do not know” answer was considered as wrong answer. Each correct answer was given one (1) mark and each wrong or do not know answer was given zero (0) marks. The score range was between 0 and 19, for there are 19 statements in the knowledge section. This score were then converted to 100 points. The classification for knowledge score of the respondents are “good knowledge” (score equal to or above 70%) and satisfactory knowledge (50-69%). Respondents that scored below 50% for knowledge were considered as “poor knowledge”.

Results and Discussion

Table 1 shows the findings related to food handlers’ knowledge on proper hand washing procedure. Most respondents are aware that there are seven steps of correct hand washing as recommended by Ministry of Health, Malaysia. Majority of the respondents (74.7%) answered item 2 correctly by indicating the statement “soaps should be used for visibly dirty hands only” as “false”. Pathogens cannot be seen on hands and water alone is not always sufficient to remove them. Food handlers should have the knowledge where hands should be washed using soaps as appropriate technique for hand washing includes the use of soap. Most of the respondents answered the statements correctly for item 3, item 4, item 5, item 6, and item 7. For item 8, there are a number of respondents (12.3%) who reported that their apron could be used for drying hands after washing their hands. This shows that some of the respondents lacked of knowledge in terms of the use of a proper medium for drying hands.
Table 1: Knowledge on proper hand washing procedure

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>True %</th>
<th>False %</th>
<th>Do Not Know %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  There are seven (7) steps of correct hand washing as recommended by Ministry of Health, Malaysia.</td>
<td>83.6</td>
<td>2.1</td>
<td>14.4</td>
</tr>
<tr>
<td>2  Soaps should be used for visibly dirty hands only</td>
<td>25.3</td>
<td>73.3</td>
<td>1.4</td>
</tr>
<tr>
<td>3  Palm of the hands should be rubbed while washing hands</td>
<td>93.8</td>
<td>4.1</td>
<td>2.1</td>
</tr>
<tr>
<td>4  Every fingers and between each fingers should be rubbed while washing hands</td>
<td>94.5</td>
<td>4.8</td>
<td>0.7</td>
</tr>
<tr>
<td>5  We should vigorously rub hands with finger nails while washing hands</td>
<td>91.1</td>
<td>7.5</td>
<td>1.5</td>
</tr>
<tr>
<td>6  Back of the hands should be rubbed while washing hands</td>
<td>97.9</td>
<td>2.1</td>
<td>0.0</td>
</tr>
<tr>
<td>7  Rinse hand thoroughly with enough water while washing hands</td>
<td>87.0</td>
<td>11.0</td>
<td>2.1</td>
</tr>
<tr>
<td>8  Hands could be dried using apron after washing hands</td>
<td>12.3</td>
<td>85.6</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Quite a number of food handlers are lacking of knowledge on appropriate times to wash their hands. As shown in Table 2, 17.8% of the respondents indicated “true” response on the statement that they do not have to wash hands before handling dry type of foods. About 8.9% respondents reported wrong answers on an item regarding there is no need to wash hands after washing face at the toilet. Food handlers have to make sure they clean their hands after entering the washrooms even if they just washing their face and not using toilets. Most of the times, they need to touch the dirty doorknob while they leave the toilet. Therefore, if they had entered the washrooms, they have to wash their hands once again before they continue with their task in the kitchen.

Table 2: Knowledge on appropriate times to wash hands

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>True %</th>
<th>False %</th>
<th>Do Not Know %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  There is no need to wash hands each time before handling dry foods</td>
<td>116</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>2  There is no need to wash hands after washing face at the toilet</td>
<td>99.7</td>
<td>2.7</td>
<td>0.0</td>
</tr>
<tr>
<td>3  There is no need to wash hands after touching face especially nose, mouth or ears</td>
<td>86.3</td>
<td>2.7</td>
<td>0.7</td>
</tr>
<tr>
<td>4  Hands must be washed each time after handling raw food</td>
<td>17.8</td>
<td>81.5</td>
<td>2.7</td>
</tr>
<tr>
<td>5  There is no need to wash hands after handling dry trash such as papers</td>
<td>81.5</td>
<td>2.7</td>
<td>0.7</td>
</tr>
<tr>
<td>6  Hands must be washed each time after re-entering the kitchen at designated break</td>
<td>11.0</td>
<td>82.9</td>
<td>6.2</td>
</tr>
<tr>
<td>7  There is no need to wash hands after cleaning and disinfect the work station</td>
<td>76.7</td>
<td>2.7</td>
<td>0.7</td>
</tr>
<tr>
<td>8  Hands must be washed each time after smoking</td>
<td>8.9</td>
<td>54.1</td>
<td>5.5</td>
</tr>
<tr>
<td>9  If I wear glove, hand washing is unnecessary</td>
<td>105</td>
<td>6</td>
<td>4.1</td>
</tr>
<tr>
<td>10  Before handling food, rinsing hands under cold water is enough to get rid of bacteria on hands</td>
<td>112</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>11  Handless bacteria from our hands can produce harmful toxins in foods</td>
<td>59.6</td>
<td>24.0</td>
<td>16.4</td>
</tr>
</tbody>
</table>
Hands should be considered as dirty after someone touches their mouth, nose, scalp or any parts of the body. For that reason, good hand washing practices should always be adhered. However, findings suggest that 11.0% of the respondents think that this practice is unnecessary. Hands must be washed each time after handling raw food. However, 17.8% of the respondents perceived they do not have to wash hands after handling raw food. About 15.8% respondents perceived that there is no need to wash hands after handling dry trash such as paper. About 11.0% of respondents gave wrong answers on the statement that hands must be washed each time after re-entering the kitchen at designated break. There are 19.2% respondents who agreed that there is no need to wash hands after cleaning and disinfecting the workstation. This is contradictory to the fact that hands should washed before returning to food preparation after cleaning equipment or food contact surfaces. Several respondents (13.0%) perceived that there is no need to wash hands each time after smoking. This finding is consistent with previous study\textsuperscript{12} which reported a lower proportion of food handlers who wash hands after smoking. Some of the food handlers (24.0%) perceived it is unnecessary to wash hands properly while wearing gloves. Most of the times, wearing gloves may give false sense of security\textsuperscript{24}. Food handlers should aware that they need to change the gloves frequently and properly wash their hands before and after they wear new gloves. There is a need to increase food handlers’ knowledge on the appropriate times to wash their hands properly while performing their job responsibilities in the kitchen.

Overall, the mean for hand washing knowledge score was 15.63 with the standard deviation of 2.17. Figure 1 below shows the hand washing knowledge score obtained by the respondents. About 124 (84.9%) respondents had good knowledge on hand washing with score $\geq$ 70%, 21 (14.4%) respondents had satisfactory knowledge with score range of 50 to 69%. Only one respondent had a poor knowledge of hand washing (score below 50%).

![Figure 1: Hand washing knowledge scores among food handlers](image)

Additionally, food handlers were classified into with- or without certification in order to assess any significant difference between these two groups in terms of their hand washing knowledge. The differences between these two groups of food handlers were determined by independent sample t-test. Result shows that there is no significant difference between food handlers with certification and without certification ($p$>.05).
Table 3: Comparison of food handlers with and without certification

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>Df</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge With</td>
<td>1.47</td>
<td>0.14</td>
<td>144</td>
<td>-1.95</td>
<td>0.78</td>
</tr>
<tr>
<td>Certification</td>
<td>1.52</td>
<td>0.15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The mean difference is significant at the .05 level.*

Inadequate hand washing by food workers is an important factor that contributes to the food-borne disease outbreaks in retail food establishments. Findings indicated most respondents are aware that there are seven steps of correct hand washing as recommended by Ministry of Health, Malaysia which was initially intended for people working at food service facilities, where a lack of such knowledge may lead to a major outbreak of food poisoning. Providing health education in food and personal hygiene to food handlers and incorporating these aspects in existing guidelines for food establishment is important so that food handler’s practices could be improved.

However, outcome of the study indicate that there are many misconceptions regarding proper hand washing practices and appropriate times to wash hands. The results are aligned with previous study which showed that although hand washing knowledge scores were high, hand washing practices were not always consistent with the accepted standard. In the current study, more than half of the respondents had not participated in any food hygiene courses other than Food Handlers Training which is mandatory for them. These show that food handlers have very limited continuous education that specifically targeted on their job practices. Provided that there are no significant differences between food handlers who received formal food hygiene training and those who had not, the finding is quite similar from several studies that found no significant impact from food hygiene education on KAP (knowledge, attitude, and practice) of food handlers. This could be due to the variation in the approach of the training and education.

**Conclusion**

The improvement of existing training and education for food handlers in Malaysia on hand washing practices should be done promptly. As suggested by previous study, incorporating regular education for food handlers is likely to improve the existing practices. Findings on the misconceptions of food handlers regarding hand hygiene knowledge demonstrate that there are several areas where education and training could be improved to promote hand washing. This also aligned with previous studies which concluded that an improved education and training should include a comprehensive on-premise class with detailed explanation of types of food-borne illnesses and its symptoms. The personal hygiene of the respondents can be improved through a better understanding of the factors influencing hand washing and cross contamination from hands to food.

**Ethical Clearance:** Done research committee

**Funding:** None

**Conflicts of Interest:** None

**References**


Determinants of Marital Adjustment among Married Persons in Ogbomosho Metropolis

Fasasi Lukman¹, Aqeel Khan², Adibah Bint Abdul Latif³, Arief Salleh Rosman³, Azlina Mohd Kosnin⁴, Mahani Mokhtar⁴, Adigun Akeem Ayodeji⁵

¹PhD Student, School of Education, University Tecknologa, Malaysia (UTM), Johor Malaysia, ²Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, ³Associate Professor, Islamic Civilization Academy, Faculty of Social Sciences and Humanities/Center of Research for Fiqh Science & Technology, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, ⁴Associate Professor, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, ⁵Lecturer, Department of Educational Psychology, Ahmadu Bello University, Zaria, Nigeria

Abstract

The study examined the determinants of marital adjustment among married civil servants in Ogbomosho metropolis, Oyo State, Nigeria. The study also examined the gender difference in respondents’ view of determinants of marital adjustment. Using a descriptive survey, purposive and convenient sampling techniques were used to select 384 respondents who participated in the study. The data collection tool was a self-designed instrument entitled “Factors Influencing Marital Adjustment Questionnaire” (FIMAQ), with 0.72 test re-test reliability coefficient. Factor analysis and independent t-test were used to analyses the data collected and the hypothesis was tested at 0.05 alpha level. The findings revealed that communication, a gap in couple’s age, a gap in couple’s educational attainment, sexual fidelity, personality differences and expectations before marriage are the determinants of marital adjustment among married persons in Ogbomosho metropolis. Also, a significant difference was found between male and female respondents on determinants of marital adjustment. Relevant recommendations were made based on the findings of the study.

Keywords: Marital Adjustment, Married Persons, Self-Designed Instrument

Introduction

Marital adjustment seems complex than it may appear. Basically, in marriage, two persons adjust to each other’s socio-emotional and psychological function. On the personality level, a couple must adjust to diverse marital issues, including such matters on relatives, children, provision and preparation of food, friends and occupation¹. Marital adjustment has four main components including dyadic satisfaction, dyadic cohesion, dyadic consensus and affection expression. According to ², dyadic satisfaction consists of the rate of happiness in relationships and also the frequency of experienced conflicts in communication. Dyadic cohesion is the rate of cohesion couples have over important affairs like managing economical issues of family and making important decisions. Dyadic consensus refers to the fact that how often couples are involved with the common activity and affection expression is also related to the fact that how often couples express affection and love to each other.

Marital adjustment is harmony and empathy in achieving common goals of life between husband and wife that leads to satisfaction from living together. Marital adjustment is one of the expressions used extensively in a family. This expression is related to many other expressions like marital success, marital happiness and marital satisfaction ³. Marital adjustment is a multi-dimensional expression that clarifies different levels
of marriage and it is a process undertaken by couples to understand individuals’ tastes, personality features, the establishment of behavioral laws and forming relationship patterns. Different aspects of life’s quality such as spiritual inclination of couples, satisfaction from life, self-efficacy, satisfaction from a job, educational success and even the length of a lifetime are all indices of marital adjustment.

Researcher explained the realistic indices of marital adjustment as spouse’s agreement on matters critical to maintaining their union, they share common activities and interest that enhance family growth as well as demonstrations of affection and mutual confidences. These would help the marital dyad’s ability to cope with day to day activities and life issues. Couples who are happy and satisfied with their marital life have few complaints about their relationship and few doubts about the certainty of the marriage’s chance of succeeding. Thus, marital adjustment is achieved when spouses get along with each other to achieve a harmonious working relationship in different areas of their life. Adjustment between husband and wife allows them to avoid conflicts or to solve them appropriately, in a way that they both feel satisfied with the marriage and relationship with each other.

There are different factors that may determine marital adjustment among couples. Finance is one of the major factors. Financial problems put an erroneous strain on a family relationship. Variables such as changes in growth and development, individual differences, home conditions, family size, human needs, parental attitudes and child training practices could also be associated with marital adjustment. Poor and weak communication is an index of marital maladjustment, lack of information exchange may itself impede resolution of difference and interpersonal tension. Hence, for couples to overcome diverse marital problems and adjust effectively in their relationship, they need to understand each other in all facets of human dynamism.

Many marriages have ended in divorce or passive relationship as a result of these experiences. Contemporary couples are exposed to frustrating experiences such as social assault from in-laws, the problem of childlessness or barreness, poor communication and a breakdown of a marital relationship. All these constitute a serious threat to marital stability and family cohesion in the country. Based on the meta-analysis of the previous studies such as 6, 10, 11, 12, 13, there are large volumes of studies on marital adjustment of couple but less attention has been paid to factors influencing marital adjustment of married persons, particularly in Ogbomosho, Oyo State. This prompted the researchers to, therefore, examine the determinants of marital adjustment among married civil servants in Ogbomosho metropolis.

**Method**

**Procedure**

The researchers administered the instrument on the selected respondents among married civil servant in Ogbomosho metropolis Oyo state, Nigeria, having sought for their consent to participate in the study. The researcher also assured the respondents full confidentiality to be able to free and to give honest opinion and their names is excluded.

**Sample**

Sample, sample size 384 civil servants participated in the study. Civil servants in 12 different government ministries and Local Government secretariats were purposively located. Convenient sampling technique was used to distribute the questionnaire to every subject that the researchers met in those secretariats.

**Instrument**

The instrument used for this study was a self-designed questionnaire entitled “Determinants Marital Adjustment Questionnaire” (DMAQ). The questionnaire consists of two sections. Section A focused on the demographic data of the respondents. Section B contained twenty (20) items on factors influencing marital adjustment of married civil servants in Ogbomosho metropolis. A test re-test reliability test was conducted on the instrument and a coefficient 0.72 was obtained. Based on this, the instrument was adjudged reliable for the study.

**Data Analysis**

The data collected were analysed using a factor analysis and t-test statistics.

**Research Questions:** What are the determinants of marital adjustment among married civil servants in Ogbomosho metropolis?
Table 1: Summary of Factor Analysis Results on Determinants of Marital Adjustment

<table>
<thead>
<tr>
<th>KMO value</th>
<th>Sig.</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>Component (Total variance explained)</th>
<th>Cum. variance %</th>
<th>Items (Rotated component matrix)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.723</td>
<td>0.000</td>
<td>2218.964</td>
<td>190</td>
<td>4.147</td>
<td>20.735</td>
<td>1 (.724)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.566</td>
<td></td>
<td>5 (.755)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.076</td>
<td></td>
<td>19 (.786)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.266</td>
<td></td>
<td>10 (.728)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.144</td>
<td></td>
<td>9 (.733)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.090</td>
<td></td>
<td>14 (.757)</td>
</tr>
</tbody>
</table>

Tables 1 showed variables or items on the independent variable subjected to a factor analysis using Principal Axis Factoring and Orthogonal Varimax Rotation. The table shows that all KMO values for the individual items (> .90) were well above .5 and the Kaiser-Meyer-Olkin measure (KMO) was .723, indicating that the data was sufficient for Exploratory Factor Analysis. The Bartlett’s test of Sphericity - \( \chi^2 \) (190) = 2218.964, \( p < .001 \) showed that there are patterned relationships among items 1 to 20 on the Determinants of Marital Adjustment scale. The Eigen-value cut-off of 1.0, shows there are 6 factors that explain a cumulative variance of 20.735% and the factor loadings after rotation using a significant factor criterion of .4 shows that, accordingly, items 1 (.724), 5 (.755), 19 (.786), 10 (.728), 9 (.733) and 14 (.757) are significant variables in the model. The items indicated communication, a gap in couple’s age, a gap in couple’s educational attainment, sexual fidelity, personality differences and expectations before marriage as the determinants of marital adjustment among married persons in Ogbomosho metropolis.

**Ho**: There is no significant difference in the determinants of marital adjustment among married persons in Ogbomosho metropolis on the basis of gender.

Table 2: Mean, SD and t-test comparing respondents’ view on determinants of marital adjustment on the basis of gender

<table>
<thead>
<tr>
<th>KMO value</th>
<th>Sig.</th>
<th>( \chi^2 )</th>
<th>df</th>
<th>Component (Total variance explained)</th>
<th>Cum. variance %</th>
<th>Items (Rotated component matrix)</th>
</tr>
</thead>
<tbody>
<tr>
<td>.723</td>
<td>0.000</td>
<td>2218.964</td>
<td>190</td>
<td>4.147</td>
<td>20.735</td>
<td>1 (.724)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.566</td>
<td></td>
<td>5 (.755)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.076</td>
<td></td>
<td>19 (.786)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.266</td>
<td></td>
<td>10 (.728)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.144</td>
<td></td>
<td>9 (.733)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.090</td>
<td></td>
<td>14 (.757)</td>
</tr>
</tbody>
</table>

*Significant at \( p < 0.05 \)

Table 2 presents the calculated t-value of 3.78 which is greater than the critical t-value of 1.96 (\( p = .000 < 0.05 \)). This indicated that there is a significant difference in the determinants of marital adjustment among married persons in Ogbomosho metropolis on the basis of gender; hence, the hypothesis is rejected.

Discussion

The findings of the study revealed that communication, a gap in couple’s age, a gap in couple’s educational attainment, sexual fidelity, personality differences and expectations before marriage are the determinants of marital adjustment among married persons in Ogbomosho metropolis. The finding of this study is in line with the finding of 11 which revealed that communication is significant to a stable and satisfactory
marital relationship. Generally speaking, communication is the bedrock of every successful marriage. It is also the life wire of marriage relationship or any other meaningful relationship. Poor communication between a couple will lead to poor inter or intra personal relationship, therefore communication is the key to a strong, healthy relationship. It allows partners to feel love and being cared for; thus, enjoying a satisfactory marriage relationship.\(^\text{15}\) equally supported the need for effective communication between couples in order to ensure effective marital adjustment.\(^\text{16}\) also discovered that communication gap is among the causes of marital conflict in families; hence, that good communication network reduces the rate of marital conflict among couples and enhances marital adjustment.

It was also found that a gap in couples’ age at marriage determine their level of marital adjustment. The age difference, in the African context, speaks much about maturity, especially for a male spouse. Couples whose age differences are between 5 to 10 years tend to adjust better than couples who got married at between the age difference of 1 to 2 years. This is in line with \(^\text{17}\) who carried out a study on the relationship between marital satisfaction, age at marriage, and marital role performance. The study found that as the age at marriage increased, marital adjustment increased as well. The finding is in line with the findings of \(^\text{18}\) who reported that older age married individuals have shown statistical significant higher mean scores of marital adjustment than younger age married individuals.\(^\text{17}\) also showed the presence of a positive correlation between age at marriage and an overall score of marital adjustment i.e. older age married individuals had more marital adjustment than younger age married individuals.

Educational attainment\(^\text{21-22}\) of couples goes a long way in influencing marital adjustment the more the level of educational attainment marriage partners has, the greater the probability of good marital adjustment and the lower the probability of divorce. This is in line with the findings of \(^\text{19}\) which revealed that the level of education of couples plays an important role in the husband-wife relationship, especially in the early days of marriage. The study found also found that the female graduates had a closest love relationship with their husbands, while the less educated group did not say that they had a close relationship with their husbands.

There was a significant difference in the factors influencing marital adjustment of literate married adults in Ogbomosho metropolis on the basis of gender. This means that gender has a significant influence on respondent view of determinants of marital adjustment. This finding disagrees with the finding of \(^\text{20}\) who demonstrated that women and men are similar in their predictors of marital adjustment; meaning that positive correlation finding was true for both males and females.

### Conclusion and Recommendations

Based on the findings of the study, it is recommended that:

- Marriage counsellors should equip couples with communication skills that can be employed in their interaction in order to avoid maladjustment in marriage.
- Intending couples should ensure that there is a relative age difference (at least 5 years) between the husband and wife. The husband should be older than the wife so there can be respect for each other, thereby, adjusting effectively to the marriage relationship.
- Couples of similar educational background should get married so that they can adjust effectively to their marital life.
- The counsellors should encourage intending couples to go into marriage at a mature age so as to be mentally and physically prepared for challenges that could lead to maladjustment in marriage.

### Ethical Clearance

Done by own Interest and with research committee

### Funding

None

### Conflicts of Interest

None

### References

Research, 2005, 42 (2), pp. 113-118.


14 Research Advisory Sample size, https://www.research-advisory.com ; 2006


22 Khan, A. Sex Differences’ in Educational Encouragement and Academic Achievement. Psychological Reports, 2012, 111, 1, 149-155.
Relationship between Personality Traits and Preferred Academic Advising Style of Malaysian Public University Students

Norashuha Tajuddin¹, Hamdan Said², Faizah Mohamad Nor³
¹PhD Student, School of Education, ²Associate Professor, School of Education, ³Associate Professor, Language Academy, Universiti Teknologi Malaysia (UTM), Johor, Malaysia

Abstract

This descriptive study identified personality traits, preferred academic advising style, and the relationship between the personality traits and preferred academic advising style of Malaysian public university students. Student personality traits are classified into 15 categories while preferred academic advising style are categorized into prescriptive and developmental advising styles. A total of 401 undergraduate students from three Malaysian public universities participated in this study. The Sidek’s Personality Inventory and Academic Advising Style were employed for data collection in this study. The data was analysed using descriptive and inferential statistics. The finding showed that most students possessed helpfulness personalities and the majority of students preferred developmental advising style for academic advising process. The findings also showed that there is a positive relationship between student personality traits and preferred academic advising style of Malaysian public universities’ students.

Keywords: personality, academic advising, developmental advising, prescriptive advising, university student

Introduction

Academic advising is a process in which an appointed academic advisor assists students to develop their overall potential¹. Academic advising is the only planned and structured development program on campus where each student has the opportunity for one-to-one interaction with an academic advisor¹-². In this process, the academic advisor becomes a source of information related to curriculum and co-curriculum, university policies, and administrative procedures for students¹,²,³,⁴,⁵. They are the intellectuals who can assist students to address issues related to academic, personal, social, and career development⁵,⁶. Due to that effective academic advising is considered one of the best drivers to enhance the development of students and that which can help ensure that students are successful in their studies and possess positive attitudes towards lifelong learning⁶,⁷,⁸,⁹.

Many studies indicated that academic advisors can assist students to overcome various campus life challenges⁶,⁸,¹⁰,¹¹. Thus, students’ readiness to meet their academic advisors affects the process of academic advising³. Unfriendly interactions between academic advisors and students will influence the students’ desire to meet and seek advice from their academic advisors. This situation will affect their relationship and the implementation of academic advising process. Careful, caring and effective academic advisors enhance student-advisor relationships and the implementation of the academic advising process²,⁵,⁶,⁸,¹⁰-¹⁶.

The effectiveness of the academic advising process can be enhanced through the personality of the students. Personality is the qualities or characteristics that form an individual’s distinctive character¹⁷,¹⁸. Those qualities make someone different from others. As reported in many studies, students with different personalities possess different characteristics, thus, they may require different methods, techniques and advising styles¹⁷-²⁰. Thus,
academic advisors need to approach students, understand their personalities, backgrounds and other important things about them to ensure successful implementation of the academic advising process\textsuperscript{21}. Students would be more comfortable meeting and discussing with their academic advisors regarding their studies when they find that their academic advisors are caring, understand their problems, and guide them according to their needs\textsuperscript{22}. In contrast, students would avoid meeting with their academic advisors if there is a lack of compatibility between them and their academic advisors or if they find their academic advisors too serious, fierce, and unfriendly for their liking. Several personality traits including one’s level of extroversion are known to have an influence on relationships between people\textsuperscript{22-24}. Thus, the identification of students’ personality traits makes it easier for academic advisors to develop appropriate strategies to improve the effectiveness of the academic advising process\textsuperscript{24}. Ineffective advising processes will negatively affect students and may lead to students quitting their studies, having a negative view of the university and its staff, and having low academic achievement\textsuperscript{13,25}.

The function of academic advisors in rendering assistance to students continues to get attention and the emphasis on academic advising styles became more apparent\textsuperscript{3,4,6,7}. Much focus is now placed on developmental and prescriptive styles of academic advising\textsuperscript{21}. Studies revealed that the majority of students preferred the prescriptive advising style for activities related to course selection, course timetable planning, registration procedures and requirements for an award\textsuperscript{26,27}. Other researchers indicated that the key to success in academic advising is to implement the advising activity using the developmental style\textsuperscript{27}. This indicates that the implementation of academic advising based on the advising style preferred by students enables academic advisors to make the optimal impact of academic advising and eventually achieve the academic advising goals\textsuperscript{21}.

The above-mentioned findings on academic advising are reported by studies that were mostly done abroad while in Malaysia, research in this area is scarce. What is the academic advising style preferred by students in public universities in Malaysia? Research needs to be carried out to identify the academic advising style preferred by students in public universities in Malaysia as our students have socio-cultural, background and life styles which are uniquely different from other countries. This study identified students’ personality traits and the academic advising style preferred by students at public universities of Malaysia. The objectives of the study are to identify student personality traits, academic advising style preferred by students, and the relationship between student personality traits and their preferred academic advising styles.

**Method**

This descriptive study was carried out by distributing questionnaires to the respondents at three public universities in the southern region of Malaysia. The Sidek Personality Inventory (IPS) was employed to identify students’ personality traits. This IPS examined 15 individual personality traits as follows: aggressive, analytic, autonomy, dependency, extrovert, intellectuality, introvert, versatility, endurance, self-criticism, control, helpfulness, support, structure, and achievement. To identify the academic advising style preferred by the students, the Academic Advising Style Questionnaire was used. This questionnaire was adapted from the Academic Advising Inventory (AAI) developed by\textsuperscript{28}. The questionnaire consists of 14 items used to identify the academic advising style preferred by the students. The questionnaire contains three main components, namely individualized education, academic decision-making and course selection. A total of 401 randomly selected undergraduate students participated in the study. The data were analysed using descriptive and inferential statistics with the assistance of SPSS.

**Results and Discussions**

Table 1 shows a descriptive analysis of student personality traits. From a total of 401 students who participated in the study, the following is a break-down of the number of students for each personality trait: 128 students with helpfulness personality, 79 students with autonomy personality, 77 students with achievement personality, 74 students with dependency personality, 65 student with structure personality, 50 students with analytic personality, 39 students with self-criticism personality, 33 students with extrovert personality, 31 students with versatility personality, 29 students with endurance personality, 29 students with support personality, 27 students with introvert personality, 23 students with aggressive personality, 22 students with control personality, and 17 students with intellectuality personality.
Table 1: Student Personality Traits

<table>
<thead>
<tr>
<th>Personality Trait</th>
<th>Frequency</th>
<th>Personality Trait</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helpfulness</td>
<td>128</td>
<td>Versatility</td>
<td>31</td>
</tr>
<tr>
<td>Autonomy</td>
<td>79</td>
<td>Endurance</td>
<td>29</td>
</tr>
<tr>
<td>Achievement</td>
<td>77</td>
<td>Support</td>
<td>29</td>
</tr>
<tr>
<td>Dependency</td>
<td>74</td>
<td>Introvert</td>
<td>27</td>
</tr>
<tr>
<td>Structure</td>
<td>65</td>
<td>Aggressive</td>
<td>23</td>
</tr>
<tr>
<td>Analytic</td>
<td>50</td>
<td>Control</td>
<td>22</td>
</tr>
<tr>
<td>Self-Criticism</td>
<td>39</td>
<td>Intellectual</td>
<td>17</td>
</tr>
<tr>
<td>Extrovert</td>
<td>33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Academic Advising Styles Preferred by Students

<table>
<thead>
<tr>
<th>Component</th>
<th>Advising Style</th>
<th>Preferred Style</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescriptive</td>
<td>Developmental</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Individualized Education</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Academic Decision Making</td>
<td>48</td>
<td>12</td>
</tr>
<tr>
<td>Course Selection</td>
<td>42</td>
<td>10.5</td>
</tr>
<tr>
<td>Overall for</td>
<td>10</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Table 2 shows the descriptive analysis of the academic advising style preferred by students based on each component of academic advising. The analysis indicated that overall a vast majority of students (391 students or 97.5%) preferred the developmental advising style over prescriptive advising (10 students or 2.5%) in each component of academic advising.

Table 3: Correlation between Student Personality Traits and Preferred Advising Style

<table>
<thead>
<tr>
<th>Student Personality Traits</th>
<th>Advising Style</th>
<th>Total</th>
<th>Pearson Chi-Square</th>
<th>Cramer’s V</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prescriptive</td>
<td>Developmental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive</td>
<td>Observation</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.1</td>
<td>2.9</td>
<td>3</td>
</tr>
<tr>
<td>Analytic</td>
<td>Observation</td>
<td>1</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.3</td>
<td>9.7</td>
<td>10</td>
</tr>
<tr>
<td>Autonomy</td>
<td>Observation</td>
<td>0</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.9</td>
<td>25.1</td>
<td>26</td>
</tr>
<tr>
<td>Dependency</td>
<td>Observation</td>
<td>0</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.9</td>
<td>27.1</td>
<td>28</td>
</tr>
<tr>
<td>Extrovert</td>
<td>Observation</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.3</td>
<td>7.7</td>
<td>8</td>
</tr>
<tr>
<td>Intellectual</td>
<td>Observation</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.1</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>Introvert</td>
<td>Observation</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.2</td>
<td>6.8</td>
<td>7</td>
</tr>
<tr>
<td>Versatility</td>
<td>Observation</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Expectation</td>
<td>0.3</td>
<td>8.7</td>
<td>9</td>
</tr>
<tr>
<td>Personality Traits</td>
<td>Observation</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

| Personality Traits         | Observation    | 0     | 9                  | 9          |

0.664  0.664
Table 3 shows the correlation between student personality traits and preferred academic advising style. The table shows that there is a moderate correlation between student personality traits and preferred academic advising style ($r = 0.664$, $p < 0.05$). If the coefficient of correlation is between 0.50 - 0.69, it reflects a moderate correlation between the variables.

The results of the analysis show that the majority of the students possessed the personality described as ‘helpfulness’, followed by the autonomy, achievement, dependency, structure, analytic, self-criticism, extrovert, versatility, endurance, support, introvert, aggressive, control, and intellectuality personality. Different personalities indicate that they have different characteristics. For example, according to 17, students with dominant autonomy personality enjoy full freedom in all actions and can control and determine their daily activities. Meanwhile students with dominant dependency personality enjoy relying on others. In making any decision, individuals with dependency personality traits usually expect opinions and advice from others, especially those with authority. Thus, students with this personality also always ask other people to point out the direction to go. As such, it is important for academic advisors to understand the personality of the students under their guidance so that the advising becomes more effective and productive.

The finding of this study is in line with 21,24 who found that students with different personalities required different methods, techniques and advising styles. 21 stated that the academic advisor should approach his/her students by understanding their personalities, backgrounds, and important information about themselves to ensure the advising provided meets the students’ needs. 23 noted that several student personality traits such as introvert and extrovert affect their interactions and associations with the environment and community. Identification of students’ personality traits can assist academic advisors to develop appropriate strategies to improve the effectiveness of academic advising 21,24.

The findings show that students preferred the development approach in the implementation of academic advisories. This shows that students prefer to discuss and give their opinions and be given the opportunity to decide. Academic advisors and students will present various options, discussing various alternatives and guidance will focus more on student development as a whole. Therefore, allowing students to choose their own direction will make the students feel more satisfied with the career path they want and they can invest in their own education. The findings are consistent with the study of 22 where a group of UTM students preferred to meet, discuss and seek advice with academic advisors using the developmental style that encourages them to think and be independent. 27,28 also noted that the key to success in academic adherence is to implement an advising activity with developmental styles. The developmental advising style promotes communication and shared responsibility.
in the advisor-advisee relationship; permits students to reach an agreement with their academic advisor; and allows the students to take initiative and responsibility, for how they would want knowledge and skills to be obtained.\textsuperscript{25,27,28}

The study indicated that not all students prefer the developmental approach of academic advising. This finding is in line with the study of.\textsuperscript{21} Prescriptive advising indicates an imbalance in power between students and academic advisors and this may subsequently lead to an authoritarian relationship. Students are assumed to be less motivated.\textsuperscript{21,26} Thus, academic advisors are entrusted to take charge for staying informed regarding rules and regulations to be delivered to the students.\textsuperscript{30,31} Academic advisors may be blamed for unsuccessful initiative for student learning, college choice\textsuperscript{32} and on-campus leadership training.\textsuperscript{33}

**Conclusion**

Ineffective advising processes will negatively affect students. Students may make the decision to quit the university, have a negative view of the university and its staff, and have low academic achievement. Students may also avoid meeting their academic advisors. The identification of students’ personality traits can ease academic advisors to develop appropriate strategies to enhance the effectiveness of academic advising process. Academic advisors need to vary their advising styles between students. Academic advising needs should ideally be person-specific, vary among students, and change over time for individual students. Thus, it is imperative that academic advisors recognize the individual students’ differences and modify their advising styles accordingly.

The implementation of academic advising process based on the academic advising style preferred by the students can ensure optimal impact and higher achievement of academic advising goals. The academic advisors need to implement prescriptive and developmental advising styles according to the student’s personality, situation and needs. The application of academic advising styles based on students’ characteristics and needs can ensure that the sharing of knowledge and responsibility, and positive interactions between students and academic advisors.

**Ethical Clearance**- Done with research committee

**Funding:** Ministry of Higher Education (MOHE) and Universiti Teknologi Malaysia (UTM) with the FRGS Vote No.4F378.

**Conflicts of Interest:** None

**References**

10. Abdul K.N. *Students’ satisfaction towards academic advising.* Skudai: Universiti Teknologi Malaysia, 2013.
26. Fielstein LL, Scoles MT, Webb, KJ. Differences in traditional and non-traditional student preferences for advising services and perception of services received. NACADA Journal. 1992, 12,2, 5-12.
Factors Influencing Career Progression of Working-Class Married Women in Oyo Metropolis

Fasasi Lukman¹, Aqeel Khan², Adigun Akeem Ayodeji³

¹PhD Student, School of Education, University Tecknologia, Malaysia (UTM), Johor Malaysia,
²Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia,
³Lecturer, Department of Educational Psychology, Ahmadu Bello University, Zaria, Nigeria

Abstract

The objectives of this study were to determine the factors influencing career progression of working-class married women in Oyo metropolis and to examine the influence of demographic variables of age, educational attainment, and job cadre on the respondents’ view. The purposive and convenient sampling technique was used to select 220 participants; out of which, 209 questionnaire forms were adequate for data analysis. The questionnaire was a self-structured type, with a test re-test reliability coefficient of 0.82. A 3-way Analysis of Variance (ANOVA) statistics was used to test hypothesis at 0.05 alpha level. The findings of the study revealed that childcare responsibilities, societal discrimination against women and sexual harassment from men are the factors influencing career progression of working-class married women in Oyo metropolis. Based on the findings of this study, it was recommended that working-class married women should seek the support of their husbands on child care; and the society should avoid discrimination against women in the workforce among others.

Keywords: Career Progression; Working-class Married Women; Implications for Counselling

Introduction

Traditionally, career pursuance and providing home needs (financial needs) is the responsibility of men. The modern, complex and dynamic society has however, led to the influx of women in the labor market. Also, the increase of women taking employment can be attributed to the impact of globalization and the demographic changes to the global workforce. Many women are now gainfully employed either in public or private establishment. This is in contrary to the existing cultural intact family system the society was practicing, where the father engaged in an occupation to provide for the family needs and the wife or mother take adequate care of the children and manage the home. This implies that the society has turned to a situation where a husband and wife are out of the home, engaged in paid job to jointly provide for family needs.

Over the years in the African context, women have been viewed as child-bearers and keepers of home. This age-old mindset has posed many unnecessary barriers on women’s pursuit of their careers. Today, as married women commonly pursue their careers outside the home, concerns as to their ability to achieve equal footing with their male counterparts without sacrificing their families is a contending issue. Women are faced with many challenges in moving up their career ladder, such as non-supportive bosses or colleagues, sexual discrimination and male chauvinism, and still list male prejudice as the main obstacles to their career progress.

Career progression means the process of climbing the corporate ladder, moving upward, or towards high ranks, coupled with higher pay and increased prestige, made possible by the cumulative experience gained in one’s field from more challenging projects and responsibilities. According to researchers, career progression is described as the positive psychological or work-related...
outcomes or personal and professional achievements one has gathered from their working experience. Progression is extremely important to employees, as half of those aged under 35 believed promotion should come every two years. Employees who see a clear progression path are more likely to be engaged and committed to their jobs.

Research showed that increased career prospects are accompanied by job effectiveness (CIPD), reduced absenteeism and unrest, willingness to remain in the organization. Male dominance in the workplace has forced a number of women to adopt a more aggressive model. The constantly reinforced message is that women succeed only if they become more assertive, competitive, dressed for success and more politically and socially astute. This places women in a disadvantaged position because they tend to lose sight of other responsibilities and they sacrifice their personal lives. Male managers have to work harder in order to be noticed and to prove that they can handle the job, the family as well as everything else. Women continue to be disadvantaged in newer management fields. They have been excluded from foreign or international management positions. A lack of women in senior positions who mentor and encourage other women is the single most important issue facing women in business.

In their quest to climb up the corporate ladder, women are facing many challenges. Family responsibility had continued to create barrier for women’s career progression especially for women with marital status and childcare. It is in this context that, women in the civil service need assistance in navigating the challenges of home and work in order to attain success in their career paths. Sexual harassment of female workers by male supervisors is evidently increasing in the workplace. Recent cases in various courts over the world particularly, in the African society give credence to the fact that sexual harassment is on the increase. According to Zippel (2002), while sexual harassment used to be a subject of jokes and ridicule, the behaviors are seen today as illegal. Zippel (2002) stated further that while cases in the past did not attract public attention, more and more women are willing to report incidents today with the expectation that employers will take the necessary action required.

The Nigeria society is patriarchal in nature, which men tend to shy away from giving women leadership responsibilities; especially responsibilities that are perceived to be important and involve making autonomous decisions. Some men also tend to be reluctant in sharing equal partnership with women in business. It is however noted that men are receptive and welcome ideas to purchase properties owned by women, they believe that such properties are in better shape than if they had been owned by women. It is against these backdrops that this study examined the factors influencing career progression of working-class married women in Oyo metropolis.

Method

Procedures

The questionnaire was administered by the researcher with the help of two research assistants, who were trained on the procedure for instrument administration, to the consented civil servants in Oyo metropolis.

Sample

The sample size for this study was 220 working-class married women. In selecting the sample, purposive and convenient sampling techniques were employed. Firstly, the researcher purposively selects 10 different government ministries, secretariats and parastatals in Oyo metropolis. Purposive sampling is a sampling technique employed by a researcher in order to deliberately select subjects because of their peculiar characteristics. On the other hand, convenient sampling technique was used to select the respondents in different locations within the ministries or secretariats.

Instrument

The instrument used in the data collection from the respondents was a self-designed questionnaire entitled “Factors Influencing Career Progression Questionnaire (FICPQ)”. The instrument was a self-structured questionnaire with 20 items. Section ‘A’ deals with demographic data of the respondents such as age, educational attainment, work experience, job cadre and marital status. The other section sought for information on factors influencing career progression of married women. The test re-test reliability method was employed and the co-efficient of 0.82 was obtained which adjudged the instrument reliability.
Data Analysis

A 3-way Analysis of Variance (ANOVA) was used to test the hypotheses formulated at 0.05 alpha level.

Results

Research Question: What are the factors influencing career progression of working-class married women in Oyo metropolis?

Table 1: Mean and Rank Order of Responses on Factors Influencing Career Progression of Working-Class Married Women

<table>
<thead>
<tr>
<th>N</th>
<th>As a married woman, the following are influencing my career progression:</th>
<th>Mean</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Childcare responsibilities</td>
<td>3.36</td>
<td>1st</td>
</tr>
<tr>
<td>1</td>
<td>Societal discrimination against women</td>
<td>3.16</td>
<td>2nd</td>
</tr>
<tr>
<td>2</td>
<td>Sexual harassment from men</td>
<td>3.11</td>
<td>3rd</td>
</tr>
</tbody>
</table>

Table 2 shows that all the twenty items were agreed upon by the respondents as factors influencing career progression of working-class married women. This is indicated by mean scores of all the items which are above the average mean values of 2.50 (benchmark) for determining the factors. Among all the items however, items 11, 1 and 2 with mean values of 3.36, 3.16 and 3.11 respectively preceded others and were ranked 1st, 2nd and 3rd. This implies that there are numerous factors influencing career progression of working-class married women in Oyo metropolis but the topmost among them are childcare responsibilities, societal discrimination against women and sexual harassment from men.

Ho: There is no significant difference in factors influencing career progression of working-class married women in Oyo metropolis based on age, educational attainment and cadre.

Table 2: A 3-way ANOVA Showing Difference in Respondents’ View of Factors Influencing Career Progression Based on Age, Educational Attainment and Cadre

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>3174.076c</td>
<td>28</td>
<td>113.360</td>
<td>1.497</td>
<td>.062</td>
</tr>
<tr>
<td>Intercept</td>
<td>113043.880</td>
<td>1</td>
<td>113043.880</td>
<td>1492.621</td>
<td>.000</td>
</tr>
<tr>
<td>Age</td>
<td>246.749</td>
<td>4</td>
<td>61.687</td>
<td>.815</td>
<td>.517</td>
</tr>
<tr>
<td>Edu</td>
<td>199.270</td>
<td>4</td>
<td>49.818</td>
<td>.658</td>
<td>.622</td>
</tr>
<tr>
<td>Cadre</td>
<td>95.995</td>
<td>1</td>
<td>95.995</td>
<td>1.268</td>
<td>.262</td>
</tr>
<tr>
<td>Age * Edu</td>
<td>1819.533</td>
<td>10</td>
<td>181.953</td>
<td>2.402</td>
<td>.011</td>
</tr>
<tr>
<td>Age * Cadre</td>
<td>1155.518</td>
<td>4</td>
<td>288.879</td>
<td>3.814</td>
<td>.005</td>
</tr>
<tr>
<td>Edu * Cadre</td>
<td>317.380</td>
<td>3</td>
<td>105.793</td>
<td>1.397</td>
<td>.245</td>
</tr>
<tr>
<td>Age * Edu * Cadre</td>
<td>.145</td>
<td>2</td>
<td>.072</td>
<td>.001</td>
<td>.999</td>
</tr>
<tr>
<td>Error</td>
<td>13632.326</td>
<td>180</td>
<td>75.735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>723483.000</td>
<td>209</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>16806.402</td>
<td>208</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .189 (Adjusted R Squared = .063)
Table 2 shows that at the degrees of freedom (df) of 4/180, 4/180 and 1/180 the calculated F-value of 0.815, 0.658 and 1.268 (p = .517, .622 and .262 > 0.05) for age, educational attainment and cadre respectively. This implies that, there was no statistically significant difference in the factors influencing career progression of working-class married women in Oyo metropolis based on age, educational attainment and cadre; hence, the hypothesis is not rejected. The interaction effects of the three independent variables (age, educational attainment and cadre) revealed that no statistically significant effect existed among the three demographic variables.

**Discussion**

The first finding is that childcare responsibilities are one of the factors influencing career progression of working-class married women in Oyo metropolis. Women are known to be responsible for proper care of the children and adequate care of the home. This was reflected in the view of the working-class married women which related that child care as significant barrier to their career progression. This finding is in line with the finding of 13 which indicated that home and family responsibilities are among the factors preventing advancement for working-class in their profession. Similar finding was also reported by previous researcher 14. This implies that combining home responsibilities with work or career becomes a herculean task for working-class women which in turn prevent them from reaching the top decision making status in many enterprises. This thus not mean that there are no married women who are reaching the peak of their profession, but it implies that many working-class married women are finding it difficult to adjust with such situation and cannot reach the power based position before retirement.

Societal discrimination was the second factor identified by working-class married women in Oyo metropolis as factor influencing their career progression. The finding of this study is in tandem with the finding of 15 which revealed that societal discrimination against working-class women is a phenomenon that still exist in this modern time and has invariably contributed to negatively to the career advancement or progression. It was also found in the study of 16 that societal discrimination worked against women in reaching the greater height in their career endeavors. This follows that despite the increase and spread of civilization in this modern society, Nigerians still have the mindset that the role and responsibilities of women should not exceed the home, to the extent that working women are being discriminated against.

It was also found in the study that sexual harassment of women from the men at their working place is among the factors influencing career progression of working-class married women. The finding of this study supports the finding of 12 which revealed that sexual harassment is a common challenge affecting many working-class women from contributing meaningfully to the progress of their work place. It was also found by 16 that sexual harassment has been one of the factors that create barriers to success of many women in the labor force to reaching the administrative position. It might not be strange is different work place where the male boss or colleagues will be harassing women sexually. In some occasions, the women might be threatened with sack letter or severe punishment should they turn down the harasser. This might have made some women to resign, many who do not resign are finding it difficult to cope with the situation, while those who accepted the offer might eventually be disappointed. All these combined, can result in discomfort and discontentment for working-class married women and can invariably discourage them from progressing in their profession.

The hypothesis tested revealed that there was no significant difference in the factors influencing career progression of working-class married women in Oyo metropolis based on age, educational attainment and cadre. The finding of this study corresponds with the finding of 17 which reported that no significant difference exists in the factors influencing career progression of women on the basis of age. The findings of the study suggest that every woman irrespective of their age, educational attainment and cadre are finding it difficult to reach the peak of their career ladder.

**Conclusion and Recommendations**

Based on the findings of this study, it can be concluded that the patriarchal attitude among the African people is pervasively influencing working-class married women to reach greater height in their career of pursuits irrespective of the socioeconomic status. In the light of this, it was recommended that:

Working-class married women should seek the support of their husbands on child care by providing them with house maid or assist them physically on
different house chores; thereby, reducing their volumes of responsibilities in the home to enable them to be more committed to their career of pursuit.

The society should avoid discriminating women in the workforce but rather encourage them through the media and various interaction focused on women; so that they can be allowed to reach greater height in their profession.

Government should make appropriate policies and ensure its full implementation against men who harass women sexually at work in order to serve as deterrent from the act; thereby, given the women the free hand to work assiduously towards achieving the best in the profession of choice.

Counsellors should create awareness for the working-class married women on the likely challenges they may face while at work and equip them with positive coping strategies they can employ to adjust with such situation in order to help them reach advanced level of their career pursuits.

Ethical Clearance- Done by own Interest and with research committee

Funding: None

Conflicts of interest: None

References


16. September L. Dual-career Couples’ Perceptions of Career Barriers. A Published Mini-thesis for
the Degree of Magister Commercial, Faculty of Economic and Management Sciences, Department of Industrial Psychology, University of the Western Cape, 2010.


The Influence of Emotional Intelligence and Personality on Career Adaptability among Teachers in Special Education Schools in Johor Bahru

Bay Yan Er1, Mohd Rustam Mohd Rameli2
1Master Student, 2Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Malaysia

Abstract

Challenging and stressful working environment faced by teachers in special education schools are a reality which cannot be denied. Research showed that teachers’ ability to adapt into challenging working environment is correlated by certain level of emotional intelligence and their dominant personality. However, lack of research has been conducted to predict the role of emotional intelligence and personality towards teachers’ ability in fitting themselves into workplace among teachers in special education schools. This quantitative research investigates the influence of emotional intelligence and personality towards career adaptability among teachers in special education schools. Respondents involved in this research were 108 teachers from three special education schools in the state of Johor, Malaysia. Quantitative data were collected through questionnaire were analyzed inferentially. Research findings indicated that emotional intelligence, extraversion, conscientiousness and openness to experience were significant predictors of career adaptability in linear regression analysis. However, extraversion and openness to experience personalities were the most significant predictors of career adaptability in multiple regression analysis. The research has highlighted the important role of emotional intelligence and personality on career adaptability in the context of special education teachers in Malaysia. The findings of this research is important to provide an insight to teachers, schools and Ministry of Education in selecting suitable teachers in teaching students with disabilities.

Keywords: Emotional Intelligence, Personality, Career Adaptability, Special Education

Background of Study

Working environment has become more complex and the diversity in terms of people and working conditions has been increased in recent years1. School environment also can be considered as challenging working environment. Challenges of school environment is not solely consisting of students’ academic achievement, education quality and students’ misbehavior but it also involves parents’ expectations towards teachers, technology and educational policies2. Teachers are required to cope with these burdens rather than focusing on teaching. Teacher is a profession that involved in a lot of changes3. Teachers are expected to interact with students with different background, recognize their learning needs, communicate with colleagues effectively, handling difficulties appropriately and complete tasks assigned by managers.

The relevancy of studying emotional intelligence among employees had been increased in 21st Century4. Affection and cognitive adjustment abilities are essential for an individual to cope with the stressful working environment that related to unforeseeable changes in the workplace5. Teachers in special education schools are responsible to modify and accommodate instructions, deliver instructions in various ways, liaise with different stakeholders and knowledgeable about legal and legislation related to special education6-7. Hence, there is a need to study emotional intelligence among teachers in special education schools.
Personality of teachers also predicts the success of providing special education to students. Special education teachers responsible to provide variety of teaching strategies to students with disabilities. They need to be patient throughout the teaching processes. Personality affects teaching effectiveness and directly increases students’ achievement. Teacher’s self-efficacy, interpersonal relationship, work commitment and work contentment are influenced by personality. Hence, both emotional intelligence and personality are the factors that needed for teachers in coping with challenging and stressful working environment.

Besides, career adaptability is an important issue that need to be studied in working environment. Career adaptability enables teachers to fulfill the demands of different students. Teachers are also able to take up new assignments given by superior, adhere to changes and always prepare for the uncertainties. Teachers who work in special education schools are required to have certain level of emotional intelligence and personality in order to cope with stressful and challenging working environment.

According to previous researches, teachers who work in special education schools are generally facing greater level of career-related stress or burnout than teachers who work in general schools. This phenomenon has urged the necessity in studying career adaptability issue among special education teachers. Hence, this research will focus on the influence of emotional intelligence and personality on career adaptability among teachers in special education schools in Johor Bahru.

Objectives

The main objective of the research is to investigate the influence of emotional intelligence and personality towards career adaptability among teachers in special education schools in Johor Bahru. Besides, this research will also investigate the influence of each emotional intelligence and personality types on career adaptability among teachers.

Methodology

Quantitative research design that involves survey in conducting research was adopted in this research. Inferential approach was used to determine the influence of emotional intelligence and personality on career adaptability among teachers in special education schools. Respondents involved in this research were 108 teachers from three special education schools in Johor Bahru, Johor, Malaysia. The number of sample is determined based on Krejcie and Morgan’s Table for Determining Sample Size from A Given Population. The participants of each school were chosen by using ratio sampling technique while teachers from each school were selected through simple random sampling. Respondents were briefed on the details of research and were informed on their right to withdraw from this research if they are not comfortable to participate in this research. Respondents who were willingly joining the research were selected as the respondents. Informed consent was given to all respondents. Self-administered questionnaires were distributed to the respondents. The questionnaires were collected at the end of the research. The data were studied and analyzed.

The questionnaire was divided into four parts which included demographic information, emotional intelligence, personality and career adaptability. The instruments involved were Wong and Law Emotional Intelligence Scales (WLEIS) developed by Wong and Law in 2002, Big Five Inventory (BFI) created by John and Srivastava in 1999 and Career Adapt-Abilities Scale-Short Form (CAAS-SF) developed by Maggiori, Rossier and Savickas in 2012. All of the instrument showed high reliability value which ranging from 0.88 to 0.90, 0.83 and ranging from 0.87 to 0.96 respectively.

Findings

Table 1 presented the linear regression result of this research. There are 108 teachers involve in this research. Emotional intelligence ($\beta=0.33$, $p<0.05$), extraversion ($\beta=0.308$, $p<0.05$), conscientiousness ($\beta=0.317$, $p<0.05$) and openness to experience ($\beta=0.426$, $p<0.05$) are the significant predictors of career adaptability. The null hypotheses are rejected. However, agreeableness ($\beta=0.141$, $p>0.05$) and neuroticism ($\beta=0.005$, $p>0.05$) are not the significant predictors of career adaptability among teachers. The hypotheses are failed to be rejected.
Table 1: Linear Regression Analysis

<table>
<thead>
<tr>
<th></th>
<th>Career Adaptability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Emotional Intelligence</td>
<td>0.330</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.308</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>0.141</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.317</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>0.005</td>
</tr>
<tr>
<td>Openness to Experience</td>
<td>0.426</td>
</tr>
</tbody>
</table>

Table 2 showed the multiple regression analysis of this research. The total number of respondents is 108 teachers in special education schools. The finding indicates that openness to experience (β=0.426, p<0.05) is significant to predict career adaptability. It contributes 17.4% (r=0.426) changes of variance in career adaptability [F(1,106)=23.522, p<0.05] among teachers in special education schools. Combination of two independent variables, which openness to experience (β=0.381, p<0.05) and extraversion (β=0.234, p<0.05) contribute 22% (r=0.484) change if variance in career adaptability [F(2,105)=16.087, p<0.05] among teachers in special education schools.

Table 2: Multiple Regression Analysis

<table>
<thead>
<tr>
<th></th>
<th>Career Adaptability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
</tr>
<tr>
<td>Openness to Experience</td>
<td>0.426</td>
</tr>
<tr>
<td>Personality</td>
<td></td>
</tr>
<tr>
<td>Openness to Experience</td>
<td>0.484</td>
</tr>
<tr>
<td>Extraversion</td>
<td>0.484</td>
</tr>
</tbody>
</table>

Discussion

Linear regression analysis findings indicated that there was a significant influence of emotional intelligence on career adaptability among teachers in special education schools in Johor Bahru. The finding was supported by past researches. Emotional intelligence is an important factor towards career adaptability among employees. The ability to control own feelings and emotions enabled employees to succeed in their career. Emotional intelligence affected employees’ ability in managing own emotions and readiness in career planning. Employees with high level of emotional intelligence were able to express and comprehend own and others’ emotions. In the context of this research, teachers in special education schools handle students with various
adaptive, cognitive and social capabilities. Beside delivering lessons to students, they are responsible to understand students’ abilities, handling students’ misbehavior and determine the types of interventions and teaching strategies that suit the students the most\textsuperscript{15}. By having high level of emotional intelligence, teachers able to make correct assumptions and stay optimistic on various situations. Hence, teachers are well-fit into the complex environment in special education schools.

Personalities such as extraversion, conscientiousness and openness to experience were significant predictors to career adaptability while agreeableness and neuroticism did not. The research findings were aligned with some previous researches\textsuperscript{16-18}. Extrovert teachers are generally sociable, outgoing, enthusiastic, confident and lively\textsuperscript{16,19}. Extrovert special education teachers adapted better in challenging situations, especially teaching students with disabilities. Teachers claimed that they used humor as strategy to manage students who showed disruptive behavior in classroom and tended to stay positive when facing the problems\textsuperscript{20}.

Agreeableness was not the significant predictor of career adaptability among teachers in special education schools. Finding was aligned with past research claiming that agreeable individual did not show notable curiosity on career interests\textsuperscript{21}. However, the findings were contradicted with most of the past researches indicating that agreeableness was the significant predictor of career adaptability\textsuperscript{16-18}. Agreeable teachers were described as reliable, easy-going, friendly, tenderhearted and open-minded\textsuperscript{16}, also able to cooperate with various stakeholders and willing to compromise when facing problems\textsuperscript{20}. They always able to adapt in different working situations. The finding was contradicted with most of the previous research findings probably due to the age range of research respondents. Majority of the research respondents were young adults. Middle and older-aged adults were more agreeable than younger adults\textsuperscript{22} and thus having better ability in adapting in their workplace.

Findings indicated that conscientiousness was significant predictor of career adaptability. Result was supported by past research\textsuperscript{17}. Conscientious teachers were persistent, goal-oriented, wisdom and committed towards accomplishment. These characteristics helped them to cope with challenging tasks in workplace. Conscientious teachers tended to make self-reflection and improvement on their teaching approach constantly. Hence, they were capable to deliver lessons smoothly in classroom. In the context of this research, conscientiousness scored the highest and was the most dominant personality among teachers. It means they were committed, organized and capable in managing students with different educational needs. Hence, teachers were better able to adapt in their working environment and fulfill their career objectives.

Neuroticism was not significant predictor of career adaptability. The finding was supported by past research claiming that career adaptability was not affected by neuroticism probably because neurotic individuals tended to withdraw from challenging responsibilities\textsuperscript{16}. However, some researches stated there was significant but negative influence between neuroticism and career adaptability\textsuperscript{18}. Neurotic individuals have lower self-evaluation compared to emotionally stable individuals. As a result, adaptive ability in workplace could not be developed.

Moreover, the findings also indicated openness to experience as the significant predictor of career adaptability among teachers. This finding was aligned with several past researches\textsuperscript{16-18}. Teachers in this research are visionary, creative, flexible and high tolerance to unforeseeable situations. They actively looking for opportunities which bring to career success. Hence, they were able to adapt better in unpredictable working environment.

Multiple regression analysis findings indicated that openness to experience and extraversion were the significant predictors of career adaptability while other independent variables (emotional intelligence, agreeableness, conscientiousness and neuroticism) were not. This finding happens may due to some aspects of these variables were captured and proved to be relevant to teachers’ career adaptability\textsuperscript{23}. However, emotional intelligence, agreeableness, conscientiousness and neuroticism were not the significant predictor of career adaptability in this research probably because other personal characteristics may have more roles and were more important predictors than these variables in this research\textsuperscript{23}.

This finding was supported by the research conducted by Zacher\textsuperscript{23} indicating that employees’ curiosity on work affected by openness to experience while extraversion forecasted individual’s control in career development.
Employees with openness to experience personality are visionary, flexible and willing to try new things in workplace. Extrovert employees are enthusiastic, lively, confident, active and sociable.

Moreover, the variables (emotional intelligence, agreeableness, conscientiousness and neuroticism) were not the significant predictors in the multiple regression analysis of this research also had been supported by previous researches. Emotional intelligence and personality varies according to age. Older individuals tend to develop positive emotional well-being and manage emotion better. For the personality, maturity increase as individuals grow older. Maturity causes the formation of personality and professional identity. Older teachers are stable, people-oriented and have well-formed identity and professional development. These characteristics allow them to have higher self-efficacy, self-confidence and more capable to cope with workplace situations. In this research context, more than half of the teachers in special education schools aged between 20 to 39 years old, who were considered as young adults. These young teachers probably still undergo identity exploration. They tend to be self-focus and have unstable personality. These phenomena probably resulted the insignificant effect of independent variables (emotional intelligence, agreeableness, conscientiousness and neuroticism) on career adaptability among teachers in special education schools.

Conclusion

This research concentrates on the influence of emotional intelligence and personality towards career adaptability among teachers in special education schools in Johor Bahru. The research findings had been discussed and aligned with the context of this research. Based on the research findings, all of the independent variables (emotional intelligence, extraversion, conscientiousness and openness to experience) except agreeableness and neuroticism personality showed an influence towards career adaptability. Out of these variables, openness to experience and extraversion personalities are the most significant predictors of career adaptability. More future researches need to be conducted in order to find out the factors that affect career adaptability among teachers in special education schools in Malaysia.

Conflict of Interest: NIL

Source of Funding: Fundamental Research Grant Scheme (Vot. No. R.J130000.7853.5F039).

Ethical Clearance: Obtained from Ministry of Higher Education, Malaysia

References


Coping Styles in Group Reality Therapy among Cardiac Women Patients with Depression

Racheal Entayang Kudang1, Mohamed Sharif bin Mustaffa2, Surena Sabil3, Aqeel Khan4, Fatahyah Yahya5

1Master Student, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia, 2Senior Lecturer, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia, 3Dean, Faculty if Cognitive Science and Human Development, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia, 4Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, 5Lecturer, Universiti Malaysia Sarawak (UNIMAS), Kota Samarahan, Sarawak, Malaysia

Abstract

Depression will be the number one major cause of illness by the year 2020. Depression has been the main factor of morbidity since a decade ago. The aim of this study is to investigate the coping styles among cardiac women patients with depression experiencing Reality Therapy. The respondents of this study are taken from Pusat Jantung Sarawak, Kota Samarahan. The respondents are four cardiac women patients waiting four heart surgery. Their age range are from 22 to 64 years old. Three respondents are from Iban ethnicity and one respondent is from Malay ethnicity. The method of the study is Qualitative method whereby four session of Reality Therapy are conducted. The data analysis method is descriptive phenomenology whereby the researcher investigates the important criterion that make up a whole structure of an experience. The findings from this study are the respondents’ coping styles during the WDEP (wants, doing, evaluation and planning) intervention. Their BDI score before and after Reality therapy are also recorded. The implication of this study is Reality Therapy and WDEP intervention can be used to help people with depression. In conclusion, the depression level in cardiac women patients are reduced after experiencing Reality Therapy.

Keywords: cardiac, women, depression, Beck’s Depression Inventory.

Introduction

Existing researches showed psychological effect on human behavior1-5. One of the form of mental illness is depression. Depression interrupts with your daily routine and practice and lessens the quality of one’s life. Cardiac disease on the other hand is several illnesses that affect the heart and nearby blood vessels. People with cardiac disease tend to experience depression than otherwise fit people. Depression has been considered the common cold of psychopathology. The comparison is unfortunate, for it conveys the impression of a frequent but mild complaint. Some depressions end fatally. The objective of this research is to investigate the coping styles of cardiac women patients after experiencing Reality Therapy.

Depression has been the main factor of morbidity since a decade ago. Since women are more prevalent to depression and cardiac disease is getting more and more common in Malaysia, this study is to investigate changes in these patient’s level of depression after experiencing reality therapy. The level of depression is measured using Beck’s Depression Inventory (BDI). The cardiac women patients undergo reality therapy session.

The duration incidence of depression in any country is between 8 and 10% (Yusoff, Rahim and Yaacob, 2011)6. Opposite to the usual conviction, cardiac disease does not only happen in advance country. The case of Malaysia is no exception; in fact, depression is the most frequent mental illness conveyed in Malaysia. Fortunately, it is also one of the very easily treated form
of mental illness, and is expected to influence nearly 2.3 million people in Malaysia, at some point in their lives (Malaysian Psychiatric Association, 2004). In Malaysia, biological theories, and thus, the pharmacological treatment of depression, are commonly used in clinical practices in community settings and hospitals; in fact, this is the main form of treatment for depression in Malaysia (Stahl, 2000). Unsurprisingly, the development of psychotropic medication in Malaysia has tended to ignore psychological aspects in the process of depression recognition and understanding, particularly for depression (Deva, 2006). While psychotherapies for the treatment of depression are applied clinically in Malaysia, it is unfortunate that no empirical evidence to support such use has been established. Further, it is still unknown whether psychological instruments for the assessment of depression and the theories for depression are valid and reliable for use in Malaysia.

Hence, this research will investigate the coping styles of these cardiac women patients with depression at Pusat Jantung Sarawak experiencing Reality Therapy.

**Method**

Psychology Phenomenology assumes human as existent or being that has history and experience that creates the history (Giorgi, 2009). Phenomenology as a philosophy is to understand everything that one’s consciousness on any future events (human, object or certain complexity) based on that one’s perspective that went through the experienced (Giorgi, 2009). As a research, phenomenology is a descriptive research that investigate the important criterion that make up a whole structure of an experience (Ricoeur & Stewart, 1978).

The data of this research depends fully on the verbatim of the respondents. Cresswell (2007) suggests that the minimum number of respondents for a phenomenological research is five respondents. According to Giorgi (2009), who was the founder of Descriptive Phenomenology Analysis, the minimum number of respondents is even more little which is three respondents. The number of respondents for qualitative research is usually depending on the concentration of information acquired from the interview.

The research respondents for this research are from Pusat Jantung Sarawak. They are cardiac women patients who are waiting for heart surgery. They were chosen through Beck’s Depression Inventory whereby they were asked to answer the inventory. The scoring of the inventory is evaluated and the patients with shows the scoring of patients with depression was picked.

**Table 1: Participant’s Demographic Background**

<table>
<thead>
<tr>
<th>Respondent’s Name</th>
<th>Race</th>
<th>Age</th>
<th>Respondent Demographic Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1</td>
<td>Malay</td>
<td>53</td>
<td>She is the first child from six siblings. She hails from Asajaya, Kota Samarahan. She is married and has four children. Her husband work as a farmer.</td>
</tr>
<tr>
<td>R2</td>
<td>Iban</td>
<td>64</td>
<td>She is the second out of seven siblings. She originally hails from Sri Aman but had stayed in Kuching for more than 30 years.</td>
</tr>
<tr>
<td>R3</td>
<td>Iban</td>
<td>23</td>
<td>She is the youngest from three siblings. She hails from Tatau, Bintulu. Her mother is a housewife and her father is a labor</td>
</tr>
<tr>
<td>R4</td>
<td>Iban</td>
<td>22</td>
<td>She is the second from three siblings. She hails from Sibu. She was once married and was divorced last year.</td>
</tr>
</tbody>
</table>

Table 1 Summary of Respondents’ Background: The session started as soon as the respondents were chosen. The researcher and the respondent met for a total of six times throughout the process and had four sessions of Reality Therapy. The first meeting was to recruit the respondents by giving out the Beck’s Depression Inventory and explaining the purpose of the research. The Reality Therapy session started on the second meeting onwards until the fifth meeting. In the final meeting, the respondents were given Beck’s Depression Inventory again to check their level of depression after experiencing Reality Therapy.
The Descriptive Psychology Phenomenology uses a five-step method of data analysis based on some principles of phenomenological philosophy (Giorgi, 2009). The first step of the phenomenological psychological method is for the researcher to assume the phenomenological attitude. The phenomenological attitude is different than the natural attitude or everyday way of understanding the world.

The second step in the data analysis requires that the researcher to read the entire “naïve description” to get a sense of the whole experience (Giorgi, 2009). The “naïve description” provided by the respondent was taken in the natural attitude in the way that she would experience things in the mode of everyday living from the commonsense perspective.

The third step in the data analysis is the demarcation of “meaning units” within the narrative so that the data can be dealt with in manageable portions (Giorgi, 2009). The researcher went through the narrative text in a subsequent reading(s) with the purpose of determining where places of meaning shift within it. According to Giorgi (2009), how or where the meaning units are delineated is not absolute. Different researchers may delineate the meaning units in different places in the same data. However, the same or different the meaning units may be among researchers, it is the results that are important to the overall quality of the analysis (Giorgi, 2009).

The fourth step was transforming the meaning units into psychologically sensitive descriptive expressions of each of them. The researcher takes the phenomenon at the psychological level to practice science rather than the transcendent level which is to practice philosophy (Giorgi, 2009). The psychological level is an individuated, worldly and personal level rather than a transcendent (universal, unconditional, and independent of experience) (Giorgi, 2009).

The fifth step in the analysis is the synthesis of the general psychological structure from the psychological constituents of the experience. Constituents therefore cannot be independent of each other, but are necessarily part of the whole structure. The purpose of this procedure is grounded in the phenomenological concept of parts and wholes. Sokolowski (2008) points out that concept of parts and wholes is not original in phenomenology but was developed by Greek philosophers Plato and Aristotle.

### Results

#### Table 2 BDI’s Scores before Reality Therapy

<table>
<thead>
<tr>
<th>Respondents</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI SCORES</td>
<td>25</td>
<td>35</td>
<td>32</td>
<td>22</td>
</tr>
</tbody>
</table>

Before experiencing Reality Therapy (WDEP Intervention):

Table 2 shows the results of the BDI score before experiencing Reality Therapy. The results indicate that R1 is in moderate depression, R2 is in severe depression, R3 severe depression and R4 is in moderate depression.

#### Table 3 BDI’s Scores after Reality Therapy

<table>
<thead>
<tr>
<th>Respondents</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R4</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI SCORES</td>
<td>9</td>
<td>17</td>
<td>13</td>
<td>6</td>
</tr>
</tbody>
</table>

After experiencing Reality Therapy (WDEP Intervention):

The table 3 shows the result of the patients after experiencing Reality Therapy. R1 is in normal state, R2 is in borderline clinical depression, R3 is in mild mood disturbance and R4 is in normal state.

The changes in emotional, thinking and behavioral changes are also recorded through their dialogue.

### Discussion

Analysis descriptive of respondents by demographic background.

The total respondents for this research are four respondents. The age range of the respondents are from 22 to 64 years old. R1 is 53 years old, R2 is 64 years old, R3 is 23 years old and R4 is 22 years old. R1 is from Malay descendant whereas R2, R3 and R4 are from Iban descendants.

According to Glasser (1998), patients with diseases are more prone to fall into depression. Especially those patients who suddenly became ill compare to those
where their disease is hereditary. This is due to their world suddenly crumble down when the doctor broke the news to them. Imagine that it was normal, or so they thought, but when they know that they have chronic illness, they will be sad and depress.

This is research is to investigate the coping styles of cardiac women patients with depression after experiencing Reality Therapy. Four questions that were required to be asked during the sessions were:

a. What do you want in the next 6 months?

b. What have you done to achieve what you want?

c. Does it help?

d. If (b) does not help, what else can you do? If (b) did help, what else that you think can help but haven’t being executed?

It was found out in the result that the level of the depression in all four respondents decreased. Even though the score of their BDI does not decreased to zero (normal), most of the respondents only have mood swings and mild mood disturbance.

Coping Style in “Want” among the cardiac women patients.

The results of “want” among the patients were that they all want to be healthy again. They want to be healthy because they do not want to stay at the hospital for too long and be away from their family.

Glasser (1998) states that patient with depression usually will want to be healthy and happy again. Sometimes people do not realize that they are not happy and no action was taken to make them happy and heal them. This result is similar with the past studies because cardiac women patients wants to be healthy and results from past studies also shows that they want to have freedom from the hospitals.

Coping Style in “Doing” among the cardiac women patients.

The results of “doing” among the patients are that they are doing many things such as exercising, reading and praying to God to be feel better about themselves and help to improve their health. They are unable to do more than these things since they are waiting for the surgery. The past studies were also supporting that depression patients are often experiencing over thinking and does not what to do. Through WDEP, these cardiac patients can plan their strategies bit by bit.

Wubbolding (1990) states that depression patients are quite passive when it comes to ‘doing’ something to overcome their depression. They fall into depression in the first place was because they felt helpless. Hence, they feel that there is nothing much that can be done to help them anymore. Fortunately, these patients had each other to support each other. They feel less lonely and is able become more active in doing something for themselves.

Coping Style in “Evaluation” among the cardiac women patients.

Overall, these cardiac patients can evaluate their own thought and mind. They know why they are always feeling sad and they can analyze what should be done to make sure their body will be healthy again. Many of them create their own alternative to become healthy other than taking medicine only. They do exercise and reading. They also change the bad habit that they have such as bad eating or sleeping habit.

Past studies by Glasser (1998) show that depression patient is unable to evaluate their mind with any help. Hence, the WDEP intervention helps them to evaluate themselves. Control is a key issue therapy. Human beings need control to meet their needs: one person seeks control through position and money, and another wants to control their physical space.

Coping Style in “Planning” among the cardiac women patients.

These cardiac patients can plan their action after the evaluate what they have done. Many of them still have other ways that they can think of on how to become healthier. They plan to do more exercise and be more discipline in changing their bad habits. The patients also focus on the present and does not think of their past problems. They focus more on their future and how they can be healthy again.

Conclusion

In conclusion, Reality Therapy helps these women patients with cardiac disease to cope with their depression. They felt better emotionally and the intervention help them to take care of their physical body better. There is
evidence that some progress had been made for women patients with depression.

It is hoped that, with further research and expansion of Reality Therapy, cardiac women patients can be treated and the rate of morbidity caused by depression is reduced.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: Done by research committee

References


9. Deva MP. Depressive illness--the need for a paradigm shift in its understanding and management, 2006.


Coping Strategies as a Mediator Between Stress and Marital Quality among Postgraduate Students

Ahmad Mustaqim Yusoff, Aqeel Khan, Adibah Abdul Latif & Dzilal Abdul Aziz

School of Education and Social Sciences, Management and Science University, Malaysia,
School of Education, Universiti Teknologi Malaysia, Malaysia,
School of Education and Social Sciences, Management and Science University, Malaysia

Abstract

The study was conducted to evaluate coping strategies as a mediator between stress and marital quality among married postgraduate students. During tertiary education, married postgraduate students are exposed by academics and family challenges which bring impact on their marital relationship. A total number of 225 respondents from various universities (UTM=45, UPM=45, UKM=45, USM=45, UM=45) were participated. Data was collected by using purposive sampling technique. All respondents were asked to answer Conflict Resolution Style Inventory (CSRI), Graduate Stress Inventory-Revised (GSI-R) and marital Quality Questionnaire (MQQ). Data were analysed using Smart-PLS Software. Based on Partial Least Squares-Structural Equation Modelling (SEM-PLS), this study showed that there were several factors have been identified as the risk factors toward marital detrimental. In order to counter the stress, coping strategies were integrated in the mediation analysis. The results indicated that coping strategies were suitable to be a good mediator to reduce the negative effect of stress towards marital quality. This study have good implications for psychologist, counsellors and educators to understand married university students’ marital relationship.

Keywords: Academic pressure, marital relationship, mediator, coping strategies

Research Background

Many previous studies have focused on the impact of tertiary education on marital quality. Currently, Malaysia aims to be an educational hub. In this sense, many efforts are done to make sure our educational system keeps improving. One of the efforts is by providing Malaysia Higher Education Blueprint. In this blueprint, Malaysian married postgraduate students also play an important role to enhance the tertiary education. Ministry of Higher Education (MOHE) wants the students to master their own discipline so that the knowledge can bring benefits for the country. However, this kind of aspiration faces challenges as the married postgraduate students are easily exposed to academic pressures. This kind of pressure among married postgraduate students exists due to discomfort response on tension state and the emotional strain during postgraduate level. They are required to accomplish certain academic demands, such as dissertation, examination and assignment. In this sense, they need to seriously consider the role of stress between academic and family. Otherwise, the stress perceived by married postgraduate students tend to reduce their marital satisfaction.

In order to reduce the impact of stress on a marital relationship, several studies marked an increase of empirical and theoretical attention to coping strategies. The ways in which individuals and spouses respond to negative effects, resolve conflicts and provide support for one another will bring benefits to marital bonding. Since a marriage involves a dyadic interaction, married postgraduate students need to know the effective ways to influence each others’ thoughts, feelings and actions. All of these have been viewed to be an important feature of marital happiness. This is due to the reason that coping strategies contribute to family cheerfulness. However less of studies try to integrate coping strategies as a mediator between stress and marital quality among married postgraduate students population. Many of the previous studies were focused more on newlyweds, parenting and arranged married. This study suggests that married postgraduate students also need to be concerned...
as they are facing difficulties to balance between academic demands and family needs\(^1\). Lacking to have adaptive coping strategies always contribute to marital detrimental\(^{11,12,13}\).

Marital detrimental is recognised based on criticism, defensiveness and stonewalling\(^7\). Regarding the criticism aspect, stress individuals treat their spouses by relationship problem\(^{24}\). They become intolerant within their marital relationship\(^{24}\). Next is defensiveness, which occurs when spouses did not take responsibility for even a small part of family problems\(^{25,26}\). Last is stonewalling, which happens when spouses choose to shut down during a conversation\(^7\). All of these aspects need to be regulated. Therefore, this study provides an evidence on the impotency to integrate coping strategies as a mediator between stress and marital quality. Otherwise, it will lead towards dissatisfaction between married postgraduate students and their spouses.

**Research Objectives**

The main objective of the study is to evaluated coping strategies as a mediator between stress and marital quality among married postgraduate students. Before conducting the mediation analysis, the direct relationship of stress towards marital quality also need to be identified. In turn, the factors that need to be mediated by the coping strategies are measured.

**Methodology**

A total of 225 married postgraduate students (105 males, 120 females) were participated from five universities in Malaysia. The universities were from Universiti Teknologi Malaysia (UTM), Universiti Putra Malaysia (UPM), Universiti Kebangsaan Malaysia (UKM), Universiti Sains Malaysia (USM) and Universiti Malaya (UM). Each university consists the same number of respondents (UTM= 45 respondents, UPM=45 respondents, UKM= 45 respondents, USM=45 respondents and UM= 45 respondents) so that the number of sample size was equally selected. This study used purposive sampling technique, therefore the respondents were selected from those who were officially enrolled as postgraduate students.

Three instruments were used, which known as Conflict Resolution Style Inventory (CSRI), Graduate Stress Inventory-Revised (GSI-R) and marital Quality Questionnaire (MQQ). The CSRI was used to measure coping strategies. This instrument had been reported to have a good internal consistency (\(\alpha=.76\))\(^{27}\). Meanwhile, for the confirmatory factor analysis, the value was .014 (RMSEA\(\leq.06\)) and Comparative Fit Index (CFI) value was .99 (CFI \(\geq.95\)). On the other hand, GSI-R was used to measure stressful events. The Cronbach’s alpha for environmental stress was \(\alpha=.85\), familial or monetary stress was \(\alpha=.77\) and academic stress was \(\alpha=.78\). One week test-retest reliability coefficient ranging from \(\alpha=.80\) to \(\alpha=.85\) was also obtained\(^{28}\). Lastly was MQQ in which used to assess marital quality. The item reliability of MQQ was \(\alpha=.94\)\(^7\). In terms of validity, the value of raw variance explained by measure was 77.5\% (\(\geq40\%)\(^7\).

**Findings**

Figure 1 shows the direct path analysis of stress towards marital quality. Based on the figure, the highest coefficient of determination was acceptance (\(R^2= 0.87\)). This result implies that environmental stress, academic stress and family stress contributed to 87\% of total variance in acceptance sub-construct. In addition, another sub-constructs in marital quality also shown the excellent values (\(R^2\geq 0.75\)). Therefore, this results denoted that stressful events played an important role to determine the changes in marital quality among married postgraduate students.

![Figure 1: Direct path analysis of stress towards marital quality](image)

Table 1 indicates the path coefficient and significant value for each sub-construct of stress towards marital quality. The highest path coefficient was the relationship between environmental stress sub-construct towards companionship sub-construct (\(\beta = -0.82\)). In terms of significant value, only six relationships were considered significant (\(\geq \pm1.96\)). The results implied that only acceptable path coefficient and significant value were contributed to predict the relationship of stress towards marital quality among married postgraduate students.
Table 1: Path coefficient and significant value of stress towards marital quality

<table>
<thead>
<tr>
<th>No.</th>
<th>Sub-Constructs</th>
<th>Acceptance</th>
<th>Social Support</th>
<th>Companionship</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Environmental</td>
<td>β= -0.76</td>
<td>t= 14.94</td>
<td>β= -0.82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 14.94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Academic</td>
<td>β= -0.10</td>
<td>t= 1.62</td>
<td>β= 0.02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 1.62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Family</td>
<td>β= -0.12</td>
<td>t= 2.85</td>
<td>β= -0.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>t= 2.85</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Direct Relationship of Stressful Events towards Marital Quality

β= -0.92 (Negative) t= 101.25 (Significant)

*Significant level (t≥ ± 1.96)

Figure 2 shows that mediation relationship of coping strategies between stressful events and marital quality. There were two negative path coefficients in the structural model, which were stress towards marital quality (β= -0.42) and stress towards coping strategies (β= -0.88). In order to evaluate coping strategies can be a good mediator or not, manual calculation has been made as shown in the table below.

Figure 2: Coping strategies as a mediator between stress and marital quality

Table 2: Mediation relationship of coping strategies for stressful events and marital quality

<table>
<thead>
<tr>
<th>Path</th>
<th>Direct Effect Coefficient</th>
<th>Indirect Effect Coefficient</th>
<th>Total Effect</th>
<th>VAF (Indirect Relationship / Total Relationship)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stressful Events (SE) → Marital Quality (MQ)</td>
<td>-0.42</td>
<td>-0.88 x 0.56 = -0.50</td>
<td>-0.92</td>
<td>-0.42 / -0.92 = 0.46</td>
</tr>
</tbody>
</table>

*Mediator=Coping Strategies (CS)

*N= 225 respondents for inferential analysis

*Significant level (t≥ ± 1.96)
Discussion

The direct relationship between stress towards marital quality has been found to be negative and significant. The direct relationship shows that an increase in stress contributes to low marital quality. In this sense, environmental stress, academic stress and family stress play a vital role on total variance in the companionship aspect. As these stressful events happened, married postgraduate students are suggested to make some adjustment on time, energy, commitment and financial resources. If not, the stress perceived by married postgraduate students tend to threaten the continuation of the marital relationships\textsuperscript{1,2,3}. They might think that postgraduate levels always potentially bring negative impact on their marital relationship. In turn, married postgraduate students tend to view that their marital relationship as disruptive.

In terms of mediation analysis, the result shows that coping strategies can be a good mediator between stress and marital quality. Based on this finding, coping strategies can regulate stress to enhance married postgraduate students’ marital relationship. Higher coping strategies help married postgraduate students to have constructive interaction within their family. Constructive interaction includes all behaviours that can enhance mutual resilience\textsuperscript{29,30}. By having constructive interaction, marital conflicts can be resolved\textsuperscript{29}. Individuals with good constructive interaction are able to have positive communication, cooperation, acceptance, and compromise\textsuperscript{7, 35-36}. These behaviours acts to reduce the problems risk. Therefore, any negative behaviour such as attack, criticism, coercion, and withdrawal can be avoided\textsuperscript{7}. In turn, it leads to emotional support within the marital relationship.

Married postgraduate students who manifest emotional support are easily develop marital awareness\textsuperscript{31}. They become aware that conflict happened might affect their engagement within the family\textsuperscript{31}. They then tend to find an effective way so that their marital interaction can be sustained\textsuperscript{7}. In fact, in this study, married postgraduate students tend to focus on the solution to resolve their marital conflict. This matter is shown based on the significant value of coping strategies to act as a mediator between stress and marital quality. This matter leads them to become supportive in discussing problems. Discussion helps them to avoid judgmental towards their spouses\textsuperscript{32}. This is due to the reason that married postgraduate students who have emotional support are likely to listen their spouses’ point of view before making any decision. In this sense, pro-relationship behaviour has been created within marital relationship. In turn, any harmful marital interaction can be avoided\textsuperscript{33,34}.

Conclusion

In a nutshell, this study shows that married postgraduate students need to well manage their stressful\textsuperscript{1,2,3}. Specifically, there are there types of stress encountered by married postgraduate students, which known as environmental stress, academic stress and family stress\textsuperscript{7}. All of these stress tend to decrease their marital quality. In turn, marital difficulties are internalised in the relationship. Married postgraduate students might think that the stress always threaten the continuation of their marital relationship\textsuperscript{5,6}. Regarding to this matter, coping strategies need to be integrated within marital relationship.

By having good coping strategies, married postgraduate students are able to perform constructive interaction, able to give emotional support towards their spouses and have a pro-relationship behaviour. All of these are needed to counter any marital detrimental during the postgraduate level. The coping strategies then diminish any negative behaviour such as attack, criticism, coercion and withdrawal\textsuperscript{7}. Consequently, married postgraduate students tend to focus more on the solution rather than the problems. They always find an effective way so that their marital interaction can be sustained. Therefore, strong marital engagement can be developed.

Source of Funding- Management and Science University (MSU)

Conflict of Interest- No

Ethical Clearance- Malaysia Education Blueprint 2015-2025 (Higher Education)

References

2. Rockinson-Szpakiw AJ, Spaulding LS, Knight A. Protecting the marriage relationship during


An Examination of the Social-Emotional Competencies among Primary School Students

Ng Ching Yee¹, Yeo Kee Jiar²
¹PhD Student, ²Professor, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia

Abstract

Social Emotional Learning is an important focus in education that develops the Social-Emotional Competencies (SEC) of students to work and live as productive citizens. The objectives of this study are to examine (i) the overall Social-Emotional composite of Year Three primary students; (ii) the SEC of the students in self-awareness, social awareness, self-management, relationship skills and responsible decision-making; (iii) the specific needs and strengths of the students’ SEC. Non-probability sampling technique specifically purposive sampling was used for this study. 35 teachers with experience in Year Three students from six National type schools in Johor Bahru, Malaysia were recruited for this study. Each teacher rated three Year Three primary students’ (n=105). This study used the Devereux Student Strengths Assessment (DESSA) to examine their social-emotional needs and strengths. The results showed the social-emotional composite is at “Need for Instruction” category. More than 43% of students were in the “Need for Instruction” category and had the lowest level of Personal Responsibility, 44% - 54% of students were in the “Typical” category while less than 9% of students were in the “Strength” category. Therefore this study is valuable in the design and development of Social Emotional Learning Intervention which will re-direct the teachers’ focus on educating rather than managing students’ social and emotional problems.

Keywords: Social emotional competencies, Social-emotional learning, Social-emotional composite.

Introduction

Social Emotional Learning (SEL) has become an imperative component in education and has gained the attention of researchers and educators. It is the process of acquiring fundamental life-skills that enhances the students’ ability to integrate knowledge, attitudes and behaviours that help them cope with daily challenges and tasks effectively and ethically (Collaborative for Academic, Social, and Emotional Learning). The SEL process develops the students’ social-emotional competencies (SEC) which consist of pro-social skills, emotional and behavioural regulation, intra- and interpersonal relationship, problem-solving and emotion coping ability that are critical to a student’s academic engagement and school success. Self-management, self-awareness and coping effectively with others enable the student’s ability to learn and provide them with the support for individual and learning achievements.

A teacher’s responsibility is to teach and shape the students’ characters into well-rounded and well-behaved individuals. However, inadequate support from school places the misbehaved students at risk of developing severe behavioural problems. School plays a vital role in fostering students’ cognitive development, as well as their social and emotional growth. The increase in SEL as preventive and early intervention efforts have been well documented. Studies found SEL programmes are useful in improving students’ attitudes, behaviour, and academic performance. Research-based SEL curricula enhance the successfullness in school and life. Intervention researches have also shown that SEL can be fostered.
Numerous studies have been done to investigate the effectiveness of SEL programmes on behavioural problems in different countries.\textsuperscript{1,2,3} This presents a broad range of research opportunities for researchers to further expand the knowledge base in this important area of education. In view of this, the current study examines the social-emotional development needs and strengths of the student.

Literature Review

The Effect of the Social-Emotional Competencies

Students who do not have adequate SEC to cope with the stress in school will negatively affect their academic performance, student-teacher relationships, and behaviour and emotional development.\textsuperscript{4} Lee\textsuperscript{6} reported students lack the five core social-emotional competencies; self-awareness, social awareness, self-management, relationship management and responsible decision-making. Inadequate SEC may lead to behavioural problems which then form a barrier towards effective classroom instruction.

The inadequacy in SEC does not only affect the individual but the society at large as well as the school system too. Individuals with social-emotional problems are not productive in educational settings and society. Insufficient social-emotional development can eventually affect the academic achievement, productivity and satisfaction with life.\textsuperscript{3} These indicate there is a need to address the social-emotional challenges seen in students.

Behavioural intervention has the ability to improve SEC in a student’s life.\textsuperscript{1,2,7} Prevention and intervention in schools are essential approaches that focus on the needs and strengths of students at diverse stages of social-emotional problems. The Social Emotional Learning Intervention (SELI) appears to address a variety of challenging social-emotional problems. With the implementation of the SELI, teachers may be able to spend more time on instruction and less time reacting to social and emotional problems in the classroom.

The Barrier in Social-emotional Implementation

Although SEL is an organized and practical approach to address students’ social-emotional problems, it is clear there are barriers to the prevention and intervention.\textsuperscript{8} The barriers highlighted by Ng and Yeo\textsuperscript{5} and Lee\textsuperscript{6} and showed teachers have limited training to employ SEL, teachers affirmed they did not have enough time to prepare for SEL lessons, and lack the knowledge on SEL implementation. The results indicate the curriculum and instructional strategies in classroom practices need much improvement in order to overcome the barriers of implementing SEL in classrooms. These critical issues should be addressed as SEL programmes have been found to be effective in developing students SEC.\textsuperscript{9} Without the appropriate training to increase teachers’ awareness of SEL, the implementation of SEL in classrooms is far from satisfactory.

In sum, literature revealed most teachers faced social-emotional problems in their classroom, challenges such as insufficient knowledge in SEL, time constraints and lack of resources in SEL implementation. There is a practical gap between the reality in school and classroom. The disparity is seen amidst the teachers’ SEL practice and training and the inadequacy of teachers’ SEL pedagogical knowledge to optimise SEC. Evidence-based approaches that yield multiple benefits need to be implemented effectively in order to address the time constraints and challenging demands in school. It is recommended to look at SEL intervention to deal with and eventually solve the behaviour problems.

Social-Emotional Learning and Moral Education

In Malaysia, education is a continuing process to educate and shape students into well-rounded and well-behaved individuals as envisioned in the National Education Philosophy. Social-emotional learning and moral education are the two main formal methods adopted in schools to support students’ behaviour. Moral education’s emphasis is on values clarification like right-thinking leading to right behaviour. Conversely, SEL is a parallel effort to moral education in teaching morality and social-emotional competencies.

The education system has the responsibility to teach children into leading a morally-guided life. For this reason, schools promote SEL for the purpose of creating moral and productive citizens. SEL and moral education offer a possible route to learn effective problem-solving skills in handling emotions and relationships. Skills in problem-solving can provide an opportunity for moral action in life. Therefore there exists a potential pathway of convergence between moral education and SEL.

Malaysia Education Blueprint for 2013 to 2025 concentrate on 6 areas of student aspirations: knowledge, thinking skills, leadership, bilingual proficiency, ethics
and spirituality, and national identity. Students need SEC to gain knowledge, think critically and demonstrate their values in ethics, leadership, communication and national identity. However, the lack of SEC among students in schools would require effective improvement strategies to institute the necessary SEC.

Analysis of SEC in Year Three Moral Subject revealed that SEC does exist in Year Three Moral subject. Social-emotional Components are embedded in Year Three Moral subject, regardless of whether teachers realise it or not. Although social-emotional components are implicitly embedded in the Moral subject, effective ways to enhance SEC are still lacking due to the absence of awareness and teaching strategies of SEL among the Moral subject teachers.

Objective

The objectives of this study are to examine (i) the overall Social-Emotional composite of the Year Three primary school students; (ii) the social-emotional competencies of the students in self-awareness, social awareness, self-management, relationship skills and responsible decision-making; (iii) the particular needs and strengths of the students’ social-emotional competencies.

Methodology

Research Design

This research design adopts the quantitative method.

Sampling Procedure

Non-probability sampling involving purposive sampling is used in this study. 35 teachers from 6 Chinese National Type schools with experience in teaching Year Three students rated Year Three students from Johor Bahru on their social-emotional competencies.

Participants

The student participants for this study came from six schools in Johor Bahru. Different schools were selected to obtain the sample from different geographical areas. 35 Chinese National type teachers were recruited for this study, consisting of different gender with different teaching experiences and they rated three Year Three primary school students in Johor Bahru, Malaysia from regular education classes.

Instrument

The Devereux Student Strengths Assessment (DESSA) is used to measure Social-Emotional Competencies in children from preschool through the eighth grade. DESSA is a 72-item strength-based behaviour rating scales instrument and contains a series of questions for raters to examine and measure a variety of behaviours according to a Likert scale. DESSA is a screening, monitoring and evaluating tool and was designed mainly to monitor social-emotional instruction and assess the outcome of the program.

DESSA produces eight scores of social-emotional competencies and an overall total score named the Social-Emotional Composite. DESSA is organized into eight Social-Emotional Competencies. Eight of the DESSA scale scores are results from the items allocated to each scale. A Social-Emotional Composite score comprised of a combination of the eight scales of SEC which include: Decision-making, Personal Responsibility, Self-awareness, Self-management, Social Awareness, Goal-directed Behaviour, Relationship Skills, and Optimistic Thinking. Two of the CASEL domains; Self-management and Responsible Decision-Making were each further categorized into two components. Self-management branched into Self-management and Goal-Directed Behaviour while Responsible Decision-Making branched into Decision-Making scales and Personal Responsibility.

Validity and Reliability of DESSA

DESSA has a high internal reliability. The internal reliability for DESSA ranges from a low .82 to a high of .94: Self-awareness (.89), Social-awareness (.92), Self-management (.92), Goal-directed behavior (.93), Optimistic thinking (.89), Relationship skills (.94), Decision making (.92), Personal responsibility (.92), and Social-emotional Composite (.99). The median value for teacher raters was .92. The Social-Emotional Composite coefficients for teacher raters (.99) is above .90 value for the total score.

Scoring and Interpretation for DESSA

The rater is required to rate on a five-point LIKERT scale ranging from 0 to 4 (Never=0, Rarely=1, Occasionally=2, Frequently=3, Very Frequently=4) on how often the student exhibit each conduct over the past four weeks. The DESSA is administered for 8 to
10 minutes. Each scale score is summed from the scores of the eight DESSA scale items. A Social-Emotional composite score is a combination of the eight scales scores, which gives a general indicator of the student’s social-emotional competencies. Items are first sum up to raw scores which are then converted to T-scores. T-scores of 60 and above signify “Strengths”, T-scores of 41 to 59 signify “Typical” and T-scores of 40 and below signify a “Need for Instruction”. The T-scores provide information about the particular needs and strengths of the students.

**Results**

The results in Table 4 show 100% (102) of Year Three students’ level of social-emotional competencies is at the “Need for Instruction” range for the social-emotional composite. The mean score for the social-emotional composite is 28.01(SD=0.10). More than 43% of students are in the “Need for Instruction” range in every component of SEC, namely self-awareness (45.1%), social awareness (43.1%), self-management (43.1%) goal-directed behaviour (46.1%), optimistic thinking (43.1%), relationship skills (44.1%), responsible decision-making (44.1%), and Personal Responsibility (47.1%). They had the lowest level in the self-awareness item (M=41.93, SD=9.13). Majority of the students are in the “Typical” range (44.1%-53.9%). Less than 9% of the students are in the “Strength” range. The result shows that there is a risk for the students to go into “Need for Instruction” range.

**Table 1: T-Score for the Eight Scale of SEC**

<table>
<thead>
<tr>
<th></th>
<th>Strength (≥ 60)</th>
<th>Typical (41-59)</th>
<th>Need for Instruction (≤ 40)</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Self-awareness</td>
<td>5</td>
<td>4.9</td>
<td>51</td>
<td>50.0</td>
<td>46</td>
</tr>
<tr>
<td>Social awareness</td>
<td>9</td>
<td>8.8</td>
<td>49</td>
<td>48.0</td>
<td>44</td>
</tr>
<tr>
<td>Self-management</td>
<td>5</td>
<td>4.9</td>
<td>53</td>
<td>52.0</td>
<td>44</td>
</tr>
<tr>
<td>Goal-directed behaviour</td>
<td>6</td>
<td>5.9</td>
<td>49</td>
<td>48.0</td>
<td>47</td>
</tr>
<tr>
<td>Optimistic thinking</td>
<td>4</td>
<td>3.9</td>
<td>54</td>
<td>52.9</td>
<td>44</td>
</tr>
<tr>
<td>Relationship skills</td>
<td>2</td>
<td>2.0</td>
<td>55</td>
<td>53.9</td>
<td>45</td>
</tr>
<tr>
<td>Responsible decision-making</td>
<td>6</td>
<td>5.9</td>
<td>51</td>
<td>50.0</td>
<td>45</td>
</tr>
<tr>
<td>Personal responsibility</td>
<td>9</td>
<td>8.8</td>
<td>45</td>
<td>44.1</td>
<td>48</td>
</tr>
<tr>
<td>Social-emotional composite</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>102</td>
</tr>
</tbody>
</table>

**Discussion**

The findings of the studies indicated that the social-emotional competencies, student-teacher relationships and behaviour development among Year Three students were not satisfactory. A majority of the students will need preventive intervention, although a minority of the students performed well in the social-emotional competencies. Therefore, DESSA can be used to examine students’ particular need for instruction and social-emotional strengths. These results can also be used to assess for social-emotional learning quality improvement and program evaluation. Prevention and intervention in enhancing the social-emotional competencies might benefit the students who are in the “Typical” and “Need for Instruction” range. SEL components do exist in Malaysia Moral Education curriculum, but most teachers are not aware of its existence and therefore did not practice SEL in their teaching. This study provides an insight into the design, development and organization of learning objectives and
content for SELI.

Through SELI, students can learn to master the expected behaviours and the social-emotional skills. The behavioural intervention also helps the students’ to be productive in the classroom. As such, SEC plays a vital role in determining how well the students socialize with peers, engage in learning and benefit from SEL instruction. Durlak et al.² assert that SEL improves achievement, increases pro-social behaviours and reduces depression and stress among student. On top of this, SEL equips the student to manage themselves and others, their relationships, and their work ethically and effectively.¹ Social-emotional learning is a critical component for individuals to be successful in school, workplace and later in life. SEL allows students to control themselves, build a relationship with friends, resolve conflicts, and make ethical and safe choices. Students with strong social and emotional skills make better use of instructional time, their classroom behaviour is less disruptive and they are less likely to be disciplined and suspended.

For students already experiencing significant social-emotional problems, DESSA can uncover strengths that can be nurtured. This study provides a better insight into the students’ social-emotional competencies in order to design and develop the Social Emotional Learning Intervention for Year Three primary school students. There is a need for teachers training programmes on SEL instruction and the application of SEL for managing students with social-emotional problems. SEL programmes should be implemented throughout the school years and aligned with academic achievements and made into an essential element of the school curriculum. Understanding which behavioural problems students faced and the coping mechanism they adopt would assist the Ministry of Education in the formulation of SEL strategies intervention programme in schools. In-service and pre-service teachers can be trained to equip them with SEL teaching strategies that support the development of SEC.

**Conclusion**

The present study indicates that there is still a lot that needs to be done for the students’ social-emotional competencies. The findings of this study highlighted the social-emotional competencies among Year Three students were not satisfactory. Research has indicated that students with social-emotional problems often encounter difficulty in the learning process as well as interrupt the learning process of others. Students who lack SEL skills are unable to learn effectively and over time they drain the educators’ energy. Unfortunately, schools have limited resources for teachers to deal with students’ SEL and schools’ exclusive focus on academic education and behaviour management are inadequate to help students achieve academic success.

Finally, teachers need considerable support and teaching resources on SEL to redress students’ social-emotional problems. Every student deserves the opportunity to succeed in school. Students who acquired social and emotional skills in school will become productive, responsible and satisfied individuals. Therefore existing resources should be used to institute SEL in teaching SEC for social, emotional and academic success.

**Conflict of Interest:** NIL

**Source of Funding:** Self source

**Ethical Clearance:** Done research committee

**References**

6. Lee MC. **Enhancing social-emotional competence to promote mental health through social-emotional learning for primary school student.** Doctor of Philosophy, Universiti Teknologi Malaysia, Skudai. 2016


12. LeBuffe PA, Shapiro, VB, Naglieri, JA. *The Devereux Student Strength Assessment (DESSA).* Lewisville, NC: Kaplan. 2009.

Parents’ Couple Relationship, Parent-Child Relationship and Emotion Regulation among Malaysian Children

Azlina Mohd Kosnin¹, Tu Chien Hui², Mohd Zaki Daud³

¹Associate Professor; ²Master Student, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM) Skudai, Malaysia; ³Lecturer, School of Electrical Engineering, Universiti Teknologi Malaysia (UTM) Skudai, Malaysia

Abstract

Studies have found the importance of parent couple relationship and parent-child relationship in relation to children’s emotional regulation. Nevertheless, these findings are based on isolated studies which do not really reflect the extent to which each factor relates with each other as well as to their children’s emotional regulation. The purpose of this study was to investigate the interactions between parents’ couple relationship satisfaction, parent-child relationship and children’s emotion regulation among children in Malaysia. Couple Satisfaction Index (CSI)-4 was used to measure satisfaction level in couple relationship, PACHIQ-R for parent-child relationship and Emotion Regulation Checklist (ERC) for children’s emotion regulation. Cluster sampling was used to select the sample and a total of 357 parents responded to the questionnaires. The analyses have found that all variables are significantly and positively correlated with each other. In other words, the findings suggest that parent-child relationship is related to parents’ couple relationship and children’s emotional regulation is related to both of these variables.

Keywords: couple relationship; parent-child relationship; emotion regulation

Introduction

Emotion regulation (ER) is emotional self-control and a part of one’s self-regulation¹. The term refers to how emotions regulate the other aspects (regulation by emotions) or to how emotions themselves are regulated (regulation of emotions). ER is defined as a complex process of initiating, restraining, and modulating the conscious emotion in achieving goals effectively. In other words, it refers to one’s ability to control own feelings and manage the behavioural outcomes appropriately in social interactions. According to Thompson², emotion regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features in accomplishing one’s goal.

With daily lives and resources congregated, family members are mutually influencing each other through daily interactions³. According to Bowen’s family systems theory, family is viewed as an emotional unit and uses system thinking in describing the complex interactions within the unit⁴. Based on the theory proposition, it is natural that family members are intensely connected emotionally and affect each other’s thought, feelings, and behaviours. Moreover, they tend to seek for each other’s attention and acknowledgement for actions, and as well react to each other’s needs, expectations and upsets. With such connections and reactivity, a change in one party would predictably lead to reciprocal changes in the others⁷.
The relationship between father and mother can incite better emotional experiences for children. Couples who are dissatisfied with their relationships often exhibit frequent conflicts and distress in their marriages or child rearing tends to reason the existence of negative emotions and withdrawal in the communication with their children. At the same time, parent-child relationship also affects children’s ER development. Strong and close relationship between parents and child would build up an important developmental basis for the children’s growth. A securely attached child often exhibited mature and healthy emotional regulation. These insights are based on isolated studies which do not really reflect the extent to which each factor relates to their children’s emotional regulation. It is also important to note that most of the past studies were done in the Western culture. Although there were few researches found in Asian and Malaysian context, these results are far too little to be conclusive with regards to the relationship between couple relationship, parent-child relationship and children’s ER among Asian and Malaysian families.

This study investigates the inter-relationships between parents’ couple relationship, parent-child relationship and their children’s ER development among Malaysian families. Results from this study could further add into the literature regarding the development of children’s performance in regulating their own emotions in relation to parents’ couple relationship and the ways parents’ interaction with their children.

**Methodology**

A total of 357 parents with children aged 11 and 12 years old from Johor Bahru district, Malaysia responded to a set of questionnaire. The questionnaire comprised of (1) the short version of Couple Satisfaction Index (CSI) developed by Funk and Rogge (2007) to measure parents’ couple relationship, (2) Parent-Child Interaction Questionnaire – revised version (PACHIQ-R) by Lange et al. (2002) for parent-child relationship, and (3) Emotion Regulation Checklist (ERC) by Shields and Cicchetti to identify the children’s level of emotion regulation. All instruments have been proven to have high reliability indices. A meta-analysis conducted by Graham et al. displayed an average Cronbach’s alpha of 0.940 from five researches in the analysis for CSI. PACHIQ-R has been found to have high reliability in past literatures with Cronbach’s alpha ranged from 0.90 to 0.93 for Conflict Resolution, from 0.78 to 0.81 for Acceptance scale, and from 0.78 to 0.95 for the total score. ERC has showed high internal consistency in most of the past researches with average Cronbach’s alpha reading 0.89 for overall scale, 0.96 for Negativity and 0.83 for Regulation.

**Results**

Normality test was conducted prior to the statistical analyses to identify the relevant statistical tests to be used. To assess the data normality, both skewness and kurtosis values as well as Shapiro-Wilk reading were identified. According to Rose et al. and Cohen et al., skewness and kurtosis scores shall comply with the rule of thumb applied. For large sample size such as 357 in this study, the skewness and kurtosis values should fall within the range of -1 and +1 to be proved normally distributed. A summary of normality test results in this study is in table 1 below:

**Table 1: Summary of normality test results**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Skewness Score</th>
<th>Kurtosis Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>5.85</td>
<td>1.51</td>
</tr>
<tr>
<td>PCR</td>
<td>1.71</td>
<td>0.19</td>
</tr>
<tr>
<td>ER</td>
<td>2.74</td>
<td>0.19</td>
</tr>
</tbody>
</table>

**Relationship between parents’ couple relationship and parent-child relationship**

The first family relationship evaluated is the relationship between parent’s couple relationship and parent-child relationship through Spearman correlation as the data were found to be not normally distributed. As shown in Table 1, the Spearman correlation indicated a significant relationship between couple relationship and parent-child relationship among the respondents. A significant weak positive relationship between the variables was proven with $r = +0.248$, $n = 357$, $p = 0.000$ ($p < 0.05$). Analyses based on parent-child subscales also show significant correlations, indicating that better couple relationship is associated with better acceptance towards their child ($r = +0.214$, $n = 357$, $p < 0.01$) as well as better conflict solution ($r = +0.237$, $n = 357$, $p < 0.01$) in parent-child interaction.
Table 2: Correlation (Spearmen’s rho) between parent’s couple relationship and parent-child relationship results

<table>
<thead>
<tr>
<th></th>
<th>Total PCR Score</th>
<th>Accept Score</th>
<th>Con. Sol. Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spearman’s rho</td>
<td>0.248**</td>
<td>0.214**</td>
<td>0.237**</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

In this study, the relationship between parent’s couple relationship and parent-child relationship was significant. The variables were positively related to each other that greater marital satisfaction facilitates better parent-child relationship in both the acceptance and conflict solution. However, the relationship was weak. The result was somehow reflected as the trend in similar past researches. From previous research findings, data demonstrated inconsistency with regards to the relationship between parent’s couple relationship and parent-child relationship. For instance, research by Amato\(^24\) found that the consequences of divorce on the family is strongly relied on the couple’s reactions towards the change. Instead, divorce may be beneficial for certain individuals. On the other hand, earlier study concluded that marital status can erode the relationship between parent and child especially when a father or mother leave the family behind\(^25\). In addition, low quality of marriage accounted the parent-child relationship and leads to less affective relationship. Severe marital dissatisfaction and family chaos contribute to non-supportive responses such as rejection and dismissing by the parents, thus defeated the parent-child attachment\(^13,26-27\).

**Relationship between parents’ couple relationship and children’s emotional regulation**

The second correlation has identified the relationship between parents’ couple relationship and children’s emotional regulation. Spearman correlation was once again applied to investigate the relationship. The results has reported a weak yet significant relationship with \( r = +0.107, n = 357, p < 0.05 \).

According to Bowen’s family theory, family members are intensely attached to each other in thoughts, feelings, and actions. They tend to constantly seek for each other’s attention, approval and supports for actions and development. Consequently, changes in one predictably bring changes in the others\(^6-7\). Furthermore, the concept is also advocated in Social Learning Theory by Bandura\(^28\) that children are likely to model the interactions between their parents while learning proper social interactions. Therefore, the marital conflicts between parents and negative family expressiveness will then impair the children’s acquisition of ER\(^1,14,29\). In contrast, if parents displayed greater satisfaction in relationship and warm interactions, positive communication is promoted\(^1,8,14,29\).

Similar result was once again confirmed in this study with the Spearman’s rho indicated significant positive relationship. However, the relationship was very weak though significant. As suggested by past literatures, this weak relationship probably moderated by several factors such as the parent’s gender and the parenting strategies they employed. Merely judging from stressors on parents and their marital relationship are insufficient and inappropriate to conclude the relationship\(^26\).

**Relationship between parent-child relationship and children’s emotional regulation**

The last research objective of this study was to gauge the relationship between parent-child relationship and children’s ER. Since both data were normally distributed, Pearson correlation was carried out. As shown in Table 2, the results showed significant relationships between parent-child relationship and children’s ER. A moderate positive relationship was identified with \( r = +0.532, n = 357, p < 0.05 \). When analysed based on children’s emotional regulation subscales, both parent’s acceptance and conflict solution were highly correlated to parent-child relationship with results \( r = +0.909, n = 357, p < 0.05 \) and \( r = +0.930, n = 357, p < 0.05 \) respectively.
Table 3: Pearson correlation between PCR and children’s ER

<table>
<thead>
<tr>
<th></th>
<th>Accept Score</th>
<th>Con. Sol. Score</th>
<th>Total ER Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total PCR Score</td>
<td><strong>0.909</strong></td>
<td><strong>0.930</strong></td>
<td><strong>0.532</strong></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Parent-child relationship is also found to relate to children’s emotion regulation development. Based on the Attachment Theory, effective communication and expression of emotions can only be allowed by a secure attachment between parent and children. Consequently, a child appears to have better ER and better behavioural management skills if he is certain that his guardians would understand and willing to communicate his expressions (Hicks and Korbel, 2013; Kim and Page, 2013).

The results indicated that children’s ER improves along with positive parent-child relationship. Specifically, significant relationships are also found when relating children’s ER to the parent’s acceptance and conflict solution. Comparatively, acceptance is defined to have higher contribution to children’s ER than conflict solution. This result is aligned with most of the previous findings10,15,16,17.

**Conclusions**

Bowen’s family theory was one of the famous theories that explained the emotional attachment between family members. Based on the theory, changes in the either member in the family bring causal reactions in the others7. In this study, this concept was studied through correlations between parent’s couple relationship, parent-child relationship on children’s ER development. For instance, the research findings showed positive and significant relationships for all three variables where better couple relationship relates to better parent-child relationship, and better children’s ER development. The significant findings serve as an extension of knowledge and information to understand the different factors that contribute to the children’s emotional development.

**Ethical Clearance:** Done from research committee

**Funding:** None

**Conflicts of Interest:** None

**References**

12. Conger RD, Conger KJ, Martin MJ. Socioeconomic


Low Back Pain Risk Assessment for Construction Industry Personnel

Norzarina Othman¹, Yeo Kee Jiar²
¹Postgraduate Student, PhD Ed. ²Professor School of Education, Faculty of Social Science and Humanities, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia

Abstract

Workers in Construction Industry (CI) are potentially to deal with injuries and illnesses, including Musculoskeletal Disorders (MSDs) in the workplace. Unfortunately, the issues related to Ergonomic Risk Factors (ERFs), that lead to MSDs always being underestimated and little attention been taken from the CI. Therefore, a study will be conducted to obtain the mitigation to reduce Low Back Pain (LBP) affected by ERFs impact to CI personnel. For the purpose of this findings, the objective is to study ERFs that caused LBP, to study Ergonomic Program (EP) that is implemented and to propose mitigation method to reduce LBP for CI personnel.

Keywords: Musculoskeletal disorders, Ergonomic risk factors, Low back pain, Construction industry personnel.

Introduction

The CI listed as a major contributor to the economic development of the country. The importance of this industry can be clearly seen through its involvement in various industries particularly in Malaysia.

However, the safety elements shall be considered and implemented in any construction project. Issues related to MSDs is one of the elements shall not be underestimate because it is common health problems in the working population.

The injury is highly affect the health of workers who exposed to hazard for a long period of working time. These injuries are caused by ERFs such as awkward posture, high force, repetitive motions, contact stress, static loading, segmental or whole body vibration, heat and cold cause, which related to the working conditions that expose the muscles, joints, tendons, ligaments, and nerves.

Literature Review

A MSDs has been recorded as high risk hazards in CI. According to the statistical report released by DOSH Malaysia 2012, indicate a high number of personnel who suffer from the occupational diseases. The increased numbers been recorded significantly since 2005; 3,002 numbers of cases being recorded in 2014 drastically increased from the previous ten years. The gap numbers recorded for the ten years are shown that the cases of occupational diseases are drastically increased with 94%. Large numbers shown the element of MSDs particularly in CI increased due to lack of attention on personnel health safety in the industry.

MSDs at the workplace were greatly increased and become serious in occupational injuries. These rapid increases make the industries suffer from tangible and intangible losses because of increased in medication costs, decreased productivity, work quality and decreased worker morale.

Due to Malaysia moving towards industrialization and the rising average age, MSDs symptoms are on the rise. These rapid increases continue to be a major source of disability, loss of working time, and also linked to serious and costly health risks. There is less emphasis on the health issues due to the nature of construction work, such as sizeable, temporary and mobile workforce, many
impermanent workers which not directly employed lack of health experts within the industry, benefits of health management are not immediate and are consequently difficult to demonstrate⁷.

**Musculoskeletal Diseases (MSDs)**

MSDs are injuries of the soft tissues that affects nearly all tissues, including the nerves and tendon sheaths, and most frequently involve the arms and back. OSH professionals have called these disorders a variety of names, including cumulative trauma disorders, repeated trauma, repetitive stress injuries, and occupational overexertion syndrome.⁶

**Ergonomics**

Ergonomics are related to human and their job. Good ergonomics prevent injury and promote health and safety. Implementation of program that includes guidelines for employees; contributes to an efficient work environment, prevent injuries and helps employees return to work after an injury has occurred.

**Table 1: Advantages of Ergonomics (Shoubi, 2013)**

<table>
<thead>
<tr>
<th>Advantages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reducing discomforts</td>
<td>by reducing the ERFs</td>
</tr>
<tr>
<td>• Increasing productivity</td>
<td>by providing job satisfaction</td>
</tr>
<tr>
<td>• Reducing absenteeism</td>
<td>Engagement with healthy environment increased productivity</td>
</tr>
<tr>
<td>• Cost &amp; time savings</td>
<td>Minimizing injuries improves productivity and reducing compensation claims</td>
</tr>
<tr>
<td>• Increasing morale</td>
<td>Safer working environment will value to employees</td>
</tr>
</tbody>
</table>

**Ergonomic Risk Factor (ERFs)**

ERFs on CI was in a straight line connected to the job structures; imperfection into interpretation of body structure and also to the MSDs through long period of time. They contribute major job factor which constituted to ERFs. Therefore, understanding in basic ergonomic principles is essential for prevention of injuries. Each employee need to understand the ERFs related to their work tasks and solutions to minimize such risks.

**Methodology**

The research methodology act as systematic way towards achieves the objectives. In this study, the process generally consisted of five stages.

The first phase involves on the background of the study. Problem statement was identified by looking at current trend. Formation of objective, title selection and scope of the study were determined based on problem statement identified.

Second phase is followed by secondary data collection with exploratory research of the literature reviews on related topic for this study.

The third phase is conducting of detail data and information collection. Questionnaire is developed using the information from literature review. Primary data is collected by the developed questionnaire where using Likert scale method on five (5) ordinal options designed. Questionnaire was divided into four (4) sections; Respondent’s Detail; ERFs caused LBP; Factor Affecting LBP; Recommendation to Reduce LBP. Questionnaire had been distributed among construction companies in Johor Bahru.

The fourth phase is data analysis, interpretation and data arrangement of primary data collected from respondent using SPSS. The percentage frequency distribution uses the risk formula from HIRARC and Average Index (AI).

The last phase of the research process mainly involved discussion, conclusion and recommendations for future study.
Results & Discussion

This study was to assess the prevalence of MSDs indicated the highest work-related symptoms which focus to LBP. Questionnaires sets were distributed to 100 respondents and 67 number of respondents returned with completely answered. The results are discussed as below based on the objectives of the study.

**Finding 1: ERFs caused LBP among CI personnel**

Objective one conducted to study ERFs on CI that caused LBP. Six ERFs elements have been categories as repetition, vibration, contact stress, awkward posture, static posture and excessive force. The result for this objective is obtained by analyzing the ERFs based on severity and frequency of personnel exposed to the risk factor. By using the risk formula and risk matrix table, the ERFs for each element have been identified.

Static posture is an element that caused to ERFs and there were four tasks which all in medium risk. Sitting for a long time found as highest risk among the ERFs that caused LBP. Followed by maintaining the same posture for extended duration and standing for a long period of time. Maintaining the same position without taking time off between assignments been identified as the lowest risk involved among the four tasks in static posture element.

Result for Repetition element shows the Performing task in the same motion repeatedly lead to the rank and followed by doing the same movements without taking time off between assignments. Both task being categorized in medium risk

From the result, one medium risk of ERFs indicates for using any body part as a tools to perform task and one low risk of performing task by pressing hard any body part to the sharp edges of workstation. Both of the tasks categorized in Contact Stress element of ERFs that caused LBP.

The finding indicates two tasks in medium risk and one task in low risk for Excessive Force element of ERFs that caused LBP. Lifting with improper posture, carrying, pushing or pulling heavy objects manually become the high ranking among the three. While using heavy or awkward tools to perform task being found as the lowest risk in the excessive force element.

Result indicate for Awkward Posture element were involved two tasks in medium risk and one in low risk. All the medium risk of ERFs that caused LBP; performing task by bending of backs and performing task involve excessive lifting or/and bending of shoulders, elbows and arms. While performing task that involve long reaches indicates as low risk in the awkward posture element.

There were three tasks involved in Vibration element and all of them were found as low risk that caused LBP. The highest risk tasks are performing task using vibration tools, followed by performing task involve vibration from vehicles and performing task involve vibration working surfaces.

Based on Figure 1, ERFs Elements that caused LBP indicated as medium risk and low risk. The average of all tasks exposure to ERFs in medium risk is static posture, repetition, excessive force, contact stress and awkward posture, which requires an approach to control hazard and applies temporary measure. While vibration become low risk that may be considered as acceptable and further reduction may not be necessary. Control measures must be implemented and recorded for any risk that can be resolved efficiently.

![Figure 1: Factor Affecting ERFs Caused LBP](image-url)
Improper motivation; latent error at management level; bad design and maintenance lead to the top three highest average value. The top three factors extremely affecting ERFs that caused LPB in CI. While lack of control by management; undesirable personality; low quality equipment; and lack of understanding followed after the top three ranking. All factors were classified under moderately affected ERFs that lead to LBP discomfort.

**Finding 2: Ergonomic Program (EP) implemented in CI**

Second analysis conducted to obtain the second objective which to determine EP that is implemented in CI. These factor were actually an external factor which may contribute in affecting ERFs that lead to LBP discomfort.

Data of EP for LBP discomfort prevention being analyzed as tabulated in Figure 6. Hazard and reporting; and training become the most important for EP to be implemented, followed by management leadership and employee participation. The least EP implemented is job hazard analysis and control, program evaluation and MSDs management is the most less EP implemented in CI.

**Finding 3: Mitigation Method to reduce LBP for CI personnel**

Third analysis conducted to proposed mitigation to reduce LBP in CI. The ways will be acquired through minimizing the ERFs. Respondent participation for this section includes CI personnel from management and technical representative who directly involved in construction project.

Administrative control element become the most recommended which lead by the setting of proper working time; assigned the correct position and proper instruction for ergonomics; provide training and information regards to LBP awareness; provides convenient working area and working furniture; and keep on records, control and monitor to reduce hazards and accidents at workplace; medical check-up regularly comes after the suggestion to create awareness regards to hazard that affected LBP; while penalties for non-ergonomics compliance comes after the independence inspector to assess safety and health that lead to MSDs.

Two suggestions come from engineering control elements which to provides convenient working tools; and build a computerize system with new technologies about health environment. Element of construction industry itself suggested to create awareness regards to hazard that affected LBP; and independence inspector to assess safety and health.

**Conclusion**

The conclusions of each objective that can be drawn out as follows;

Objective 1: To Study ERFs that caused LBP among CI personnel

The first objective of this study has been achieved through questionnaire survey by analyzing the respondent’s exposure to ERFs that caused LBP.

i. From the result, six ERFs affecting LBP being categories as repetition, vibration, contact stress, awkward posture, static posture and excessive force.

ii. Five ERFs falls onto medium risk while the other being categorized as low risk.

iii. This finding found that none high risk involved due to safety officer provided at most construction project and safety and health data being recorded, controlled and monitored regularly. Besides, most of construction companies have implemented an EP in order to reduce MSDs and injuries at workplace.

iv. Static posture become the high risk exposure toward ERFs to suffer LBP and followed by risk factors of repetition, excessive force, contact stress and awkward posture. Five highest ERFs elements being categorized under medium risk which a planned approach to control the hazard and applies temporary measure is required. Actions taken must be documented on the risk assessment form.
including date for completion.

v. While vibration where the factors may be considered as acceptable and further reduction may not be necessary. However, if the risk can be resolved efficiently, control measures should be implemented and recorded.

vi. The finding also shows all personnel involved in CI are in medium risk and low risk. This indicates that CI personnel were actually exposed to ERFs that may cause to LBP as the nature working condition in CI.

**Objective 2: To Study EP that is Implemented in CI**

Second objective of this study being achieved through questionnaire survey by analyzing the EP that is implemented in CI.

i. The study shows that MSDs management and program evaluation extremely affected ERFs that caused LBP. This result clearly shows management are the underlying causes leading to MSDs injuries, as if management improve their job which define “planning, organizing, leading, and controlling,” the MSDs can be prevent from happening. Management need to take every safety measure available to minimize the ERFs that helps to reduce the MSDs that lead to LBP.

ii. Job hazard analysis and control, management leadership and employee participation, training and hazard information and reporting also contribute in affecting ERFs that lead to LBP. EP are highly preferred to be implemented in construction personnel in both workers and management representative on CI. The organization environment need to continuously implemented the EP to prevent LBP from occur.

iii. The management provides training and information regards to LBP awareness to employees and all parties involved; and build a computerized system with new technologies about health environment. The proposed mitigation may enhance with conducting EP through training and computerize system for hazard information, records, controls, monitors and reporting.

iv. Management may support with financial supply for medical checkup regularly such as once in a month.

v. Management may provide convenient working area and furniture; and proper working tools in creating safe and healthy working environment.

vi. Set up penalties for non-ergonomic compliance to ensure the achievement in reducing LBP due to employees had an undesirable personality especially when comes in complying with rules and regulation. The proposed mitigation, will ensure employees to comply with all the ergonomic instructions.

vii. Finally, the involvement from the third parties such as DOSH represent the CI to provide independence inspector to assess all safety aspects respect to MSDs. This proposed mitigation can be adopted in order to reduce MSDs that lead to LBP.

**Ethical Clearance:** Done research committee

**Source of Funding:** None

**Conflicts of Interest:** None

**References**

1. Borneo Post. Musculoskeletal disease increase cause for concern; 2013
2. Chong HY & Low TS. Accidents in Malaysian CI: Statistical Data and Court Cases; 2014
3. CIDB. The Construction Workers; 2012
4. Department of Occupational Safety and Health (DOSH); 2012.
5. DOSH. Guidelines for Hazard Identification, Risk Assessment and Risk Control (HIRARC); 2008.
10. HSE. Vibration at work; 2014.
Impacts of Natural Disaster on Children: Development of the ‘MAIN’ as Inventory

Hafizah Harun¹, Rohaya Talib¹, Habibah @ Norehan Haron², Hamimah Abu Naim¹, Marlina Ali¹
¹Senior Lecturer, School of Education, Faculty of Social Sciences and Humanities, University Teknologi Malaysia, ²Razak Faculty of Technology and Informatics, University Teknologi Malaysia, Kuala Lumpur

Abstract

Children are the most vulnerable victims during natural disaster and majority are neglected from aspect of psychosocial support. A 6.0 magnitude earthquake of June 5, 2015 in Sabah resulted in 18 fatalities, among them 12 year-olds schoolchildren, and disrupted normality of lives. This study investigated impacts of natural disaster on school children. The MAIN (acronym for Measurement of Adverse effect INventory) was developed to collect the required data and consisted two sets of measurement. The first set are instruments assessing children posttraumatic stress disorder symptom (PTSD), and preparedness / awareness of both children and related authorities. The second set consisted of initiative game modules that examine problem solving skills and heart rate (HR) responses during simulated situations. Respondent were 100 school children and 50 mixed populations. Results of the quantitative and qualitative data were triangulated. Low levels of PTSD but high levels of empathy were displayed. Adequate contingency plans and designated emergency centres were needed, A disaster risk education and training drills were proposed, as embedded into existing curriculum. HR variability occurred dependent on positions of the player. And both types of audio interventions significantly decreased the HR to normal levels faster than no interventions procedure.

Keywords: disaster, MAIN, initiative games, HR responses, PTSD, preparedness / awareness

Introduction

Natural disaster is an open problem that affects humans in terms of direct, indirect and intangible losses. Direct losses involved costs such as to repair physical damages due to destructions of amenities. Disruptions to normality of life in terms of economies are examples of indirect losses. Intangible losses include the psychological impairments an individual suffer as a result of both the direct and indirect losses. There have been several approaches and tools used to study these impacts.

Assessment of the disaster is usually done to estimate resources for replacement and mitigate consequence of the damage to the more tangible losses.

Studies examining physical and psychological effects mainly involved single assessments such as standardized questionnaires to collect self-reported information on symptoms and quantified using numerical scores.

Natural disasters are sudden events that negatively impact the immediate wellbeing of humans. Communities and more than half children take years if ever to overcome the adversities. Children that are victims of war and other extreme situations suffers both physically and psychologically if they have limited support from parents or communities. The problem is often comorbid, one affecting the other and illnesses rampant as access to medical care and food supply is cut off or contaminated.

Earthquakes are frightening and stressful experience. Children are less able to express their stresses such as grieves of losing loved ones, looking at parents undergo stress, and seeing damages to their homes. Often undetected and take lapse of time to be identified, they suffer silently from distress symptom...
such as posttraumatic stress (PTSD) and depression. PTSD symptoms include intrusive memories, avoidance, changes in emotional reactions and hyperarousal.

The 6.0 magnitude earthquake that shook Sabah were considered light, but 18 climbers and guides were killed as they were struck by boulders on the slopes of Mount Kinabalu. Seven of the victims were 12 year olds school children from a Singapore school and others were adults including Malaysians and others. Nevertheless the quake caused tangible losses damaging the geographical landscape and economy of the local communities and destroys livelihoods.

Hence, the MAIN inventory was developed to investigate impacts of natural disaster on school children. The purpose of this study was to report the protocol and results obtained. And further discuss implications of the findings.

Method

Permission to run the study was acquired from the Education Department of Sabah. Visits were carried out on the 23 – 30 November 2015. Sample were students and communities from the town of Kundasang and immediate areas located in the district of Ranau from six schools located closest to Mount Kinabalu, the center of the 2015 Sabah earthquake.

The MAIN (acronym for Measurement of Adverse effect INventory) developed to collect the required data consisted of four measurement tools (Figure 1). Two of which comprised instruments (I₁) that assessed students posttraumatic stress symptom (PTSD) and (I₂) the schools’ authorities and communities preparedness - awareness (P-A) using set of questionnaires and interviews. The other two contained modules (M₁) that investigated students’ physiological responses (HR-heart rate in beats per minute) during a simulated game play situations and (M₂) the HR recovery trends using two intervention procedures.

Data for I₁, where only 15 minutes was needed to complete the measure, and all the I₂, M₁, and M₂ were collected during the one week visit

![Figure 1: Design of the MAIN inventory](image)

**Instrument component (I)**

The I₁ is child version of PTSD questionnaire, adapted from the adult scale and developed by Foa et al. This diagnostic scale was adapted into Bahasa Malaysia and Malaysian context from internationally published studies (test-retest reliability of 0.96 and validity kappa of 0.64 - Blanchard et al.².

The I₂ consisted of specific preparedness / awareness (P / A) questionnaires and a structured interview sessions. Test-retest reliability of the P / A was alpha = 0.81. Targeted respondents are school supporting staffs such as teachers, clerical, gardeners and guards and/or students that should be at the schools during the research team visits. The P / A questions pertained to inquiring the level of preparedness and awareness during occurrence of natural disaster. The head of schools and senior administrators were interviewed discussing emergency and contingency plans that ensures safety in case future calamities reoccurs.

**Module component (M)**

The second school visits where appointment had been made to collect the M₁ and M₂ data, group of students came to participate in the simulated game situations. They live in the surrounding areas where tests were completed at the respective school halls and community centres. Since the children came with their families, permission was acquired from parents to participate in the M₁ and M₂ data collection sessions.

M₁ consisted of simulation game situations that tested children high order thinking skills during the process of solving situational stressful problems. Each individual heart rate data were recorded prior to, during and after the simulated game play. The game requires that students worked in groups of five to overcome
prescribed obstacles. The students assigned themselves to positions 1 through 5, besides having their legs tied to each other; the third person was also blindfolded. Video cameras and scorecards were used to record number of mistakes or falls of each person in the group and time for the group to complete the game (Figure 1).

M₂ examined the heart rate recovery response of the students. Directly after completing the M₁ activities, students are randomly assigned to two experimental procedures, recovery response listening to instrumental music audio and the melodious Islamic call of the azan with a control sample (no audio interventions) (Figure 2).

RESULTS AND DISCUSSION

The four components that made up the MAIN produced both quantitative and qualitative data.

Instrument component, I₁ and I₂ inventory:

A total of hundred and one questionnaires had been successfully completed and returned to the investigator consisting samples of thirty-five boys and sixty-six girls (88 % were 12 year olds and the rest 11 to 15 years) whose religions were Islam (52.5 %) and Christianity (47.5 %).

The PTSD checklist is a self-report measure that assessed the severity of symptoms (response format of a low to high 4-point likert scale). The 17 items diagnostic scale indicated the relative frequency to which respondent had been bothered by a particular symptom. In this paper the impact of trauma are clustered into three matrixes of cognitive, emotion and physical symptoms (scores of 1-2 as low, 2-3 moderate, and 3-4 high). The children that participated in this study reported low to moderate posttraumatic symptoms after six months of the Kundasang - Ranau earthquake.

Cognitive symptoms constitute items 1, 2, 3, 8, 15, and 16 - Intrusive Recollect, Flashbacks, Upset by Reminders, Psychogenic Amnesia, Concentration Impaired, and Hyper vigilant. The emotional symptoms are items 4, 6, 7, 8, 9, 10, 11, 12, and 14 - Distressing Dreams, Avoid Thoughts, Avoid Reminders, Anhedonia, Estrangement from Others, Psychic Numbing, Foreshortened Future and Irritability/Anger. And physical symptoms included items 5, 13, 17 - Physical Reactions to Reminders, Sleep Difficulty, and Exaggerated Startle

For the P / A, sample consisted of nine males and forty-one females secondary school students, teachers and other staffs. Seven government officials from the local education department and school administrators participated in the interviews. After the sessions, researchers were given tours of the school areas directly affected during the 30 seconds quakes. Some of the building structures such as the walls and floors in the offices and classrooms, the students hostel and teachers housing complex had minor cracks and deem unsafe by the public works department.

Interviewed staffs had been in their related services ranging from two to twenty-one years. All of them agreed it was fortunate the disaster occurred during the Malaysian school mid-term holidays. Liability was
low for the schools as only about fifty students were in schools, a few teachers and school staffs. These students were having extra classes preparing for their SPM (secondary five) and UPSR (primary six) examinations. From the interviews none of the students suffered any injuries but were terrified and girls crying during the event.

Attendances of students and teachers were low as school reopened on Monday since the earthquake occurred on Friday for the term. Most either had left the affected areas or stayed home with their families fearing that more tremors would occur. However, it increases during the week as talks, emergency drills and safety action plans were given by the Education, fire and meteorological departments.

Towards future natural disasters, results indicated moderate to high levels of P/A among respondents (scale of 2.10 to 2.66). Changes to classroom designation according to students’ age and lessons on disaster should be inculcated into existing curriculum and during co-curriculum.

**Module component, M₁ simulation games and M₂ recovery with audio interventions:**

Participations included six groups (five person per group) of thirty boys and seven groups of thirty-five girls that were matched for age and approximate height and size.

Comparing for gender, the heart rate fluctuations and number of errors committed by the girls were higher than the boys (Figure 4). However, no differences were found in the time (minutes) to complete the tasks in the simulated game situations.

Also, as expected persons in position three (who were blindfolded) exerted larger heart rate fluctuations compared to persons in other positions. Being handicapped by sight would have a disadvantage; both the boys and girls had triggered slightly different physiological response.

M₂ were undertaken immediately after completing the simulated game. Knots at the legs and blindfolds were undone, and the children were taken aside for active rest and recovery sessions. While still attached to the heart rate chest monitors, students were randomly seated and given headsets where two persons were assigned to instrumental music, two to melodious calls of the azan (Islamic prayer) and one person without any audio interventions.

![Heart rate responses](image)

**Figure 5: Heart rate responses**

For the recovery sessions, heart rates were reported every minute for four minutes (Figure 5). The heart rates were compared between the two audio interventions and recovery processes between using audio and no audio. There was no statistically significant difference in the heart rate recovery response between the instrumental music and Islamic azan calls audio procedures. However, the two musical audio interventions significantly decreases the recovery heart rate faster than without any audio sessions (p < 0.5).

The four measurement tools that constitute the MAIN inventory yielded both quantitative and qualitative results. In processing data from the instruments and modules, triangulations would further produce a holistic measure of the psychological and physiological impact of natural disaster affecting school children.

This initial analysis indicated that overall 17 PTSD symptoms were low to moderate. Bonanno et al.\(^3\) suggested that posttraumatic stress symptoms appear to be common in the first months post-event with a decline over the first year or longer. Hence the diagnostic judgments about possible presence of PTSD should consider both temporal and spatial parameters to within a few weeks to a month of the disaster. Compassion might have been overcome with time and daily life activities.
Moreover, association or empathy to who was involved as casualties should be a considered factor since the 12 year olds were not local Kundasang - Ranau children. Samples in the study should have also included younger children, since the earthquake affected their homes and schools.

The interviews and second set of questionnaires disseminated to other than children did reveal the state of preparedness and awareness of the school authorities and adults during a disaster. The sudden occurrence demonstrated implications for safe shelter and medical emergencies to be thoroughly planned. Since the school children have never experienced any kind of disaster and thus lack the skills to face natural disaster, disaster risk education curriculum could be embedded in existing school subjects.

The modules, that is the simulation games scenario or initiative games could suitably train the children on cooperative problem solving skills and teamwork. In training for preparedness to future disaster, these games could be introduced during physical education classes or incorporated in extracurricular activities. Moreover the use of audio interventions demonstrated that increased heart rate response during high levels of fear or nervousness experienced to cope with stressful situations could be better managed rather than without any interventions.

**Conclusions**

Triangulations in terms of approaches (quantitative and qualitative) and respondents (children, teachers, administrators) have given insight of what really happened to the affected children. So, a holistic program (which involve cognitive, affective and psychomotor domains) needs to be planned for a better recovery process. The module can be retested for the other types of disaster victims (earthquake, flood, hurricane) to establish the predictive validity of the inventory.

**Ethical Clearance**- Done research committee

**Funding:** Flagship grant under the project of Cascading GeoHazard Research Initiative MULTI-HAZARD UTM @ Kundasang 23 – 30 November 2015 (Leader - Khamarrul Azahari Razak), Razak School of Engineering and Advanced Technology UTMKL & Malaysia-Japan International Institute of Technology (MJIIT).

**Conflicts of Interest:** None

**References**


Addiction Rehabilitation and Structural Family Therapy

Raymond Shoup¹, Diana-Lea Baranovich²

¹Master of Psychology Student, Behavioral Sciences Department, California Southern University, California,
²Associate Professor, Educational and Counseling Psychology Department, University of Malaya, Kuala Lumpur, Malaysia

Abstract

Addiction is a societal problem that has affected people from all over the world. As this is the case, a serious look needs to be taken with regards to treatment. Structural Family Therapy was fathered by Salvador Minuchin, who believed that addictions in the family causes a shift in the dynamic of the family, which is where addiction rehabilitation treatment with family members affected by addictions should begin. When working with clients who have addictions, it is important to view the client through a holistic lens; meaning we must view how the substances/activities, and the stresses in their lives which led them to the substances/activities, cause changes in their psychology and physiology. From there, we can create a treatment plan that works with families that offers a prognosis for the client’s life, not just treating their addiction. Structural Family Therapy is great for this, has part of treatment is looking at the client holistically, and helping heal the various parts of the clients lives, including healing their family unit.

Keywords: Addiction, Rehabilitation, Family Therapy

Introduction

When a person goes through an addiction, every aspect of their life changes, including their role and dynamics with the family. Structural family therapy discusses that dysfunction in families can evolve from three dimensions, boundaries, alliances and splits, and hierarchy of power. Structural family therapy was developed by Salvador Minuchin, who developed the practice from his certifications and practices in child psychiatry and psychoanalysis. When it comes to addiction, all three of these dimensions are changed, and need to be adapted when discussing treatment. With addictions, there are two components that need to be addressed, the physiological, which addresses what the body is going through during addictions and withdrawals, and the psychological, which addresses why the client has addictive behaviors, and how the addiction(s) affect them mentally. Structural family therapy, which in the past has been used to help those with eating disorders, a type of addiction in and of itself, could potentially be a great therapy process for both the person with the addiction, and their family members.

Salvador Minuchin

Born in Argentina in 1921, Salvador Minuchin was a pioneer of family therapy. By 1947, he had received his medical license and began working as a pediatrician; eventually leaving the field to serve in the Israeli army. Once his military service was completed, he moved to the United States to study psychiatry, eventually becoming certified in child psychiatry and psychoanalysis by 1967. While receiving his certifications, he was offered a position as the director of the Philadelphia Child Guidance Center. While working as the director of the Philadelphia Child Guidance Center Minuchin developed a new method of working with the center’s patients¹. This method would later be known as structural family therapy (SFT). Minuchin would eventually use SFT to work with patients who have eating disorders, combing techniques from both SFT and cognitive-behavioral therapy. With eating disorders being a type of addiction, and a common cooccurrence with other types of addictions, it is not a stretch to suggest that SFT would work well when working with clients suffering from addictions, and their family members.
Structural Family Therapy

SFT works along the theory that families need therapeutic intervention when there is dysfunction within the family structure, usually resulting in a problem with communication and family role disruption. SFT assesses three dimensions of family dysfunction; hierarchy of power, clarity/firmness of boundaries, and alliances/splits. Hierarchy refers to the level of authority within the family, who holds this authority, and how this authority is executed. Within hierarchy there are three forms that can manifest i.e Effective, insufficient and excessive. In an effective hierarchy, parents hold authority by setting rules while remaining emotionally invested and connected with the children. Insufficient hierarchy is one where parents are ineffective in raising the children in an appropriate manner, which can often lead to permissive parenting, giving the children the authority, to an extent. Excessive hierarchy discusses strict rules enforced unrealistically and bonding with the children often suffers and/or is lacking. Boundaries describe the level of emotionality and closeness of a family unit. There are three levels of boundaries; enmeshment, which is when family members are too much in each other’s business, clear boundaries are described as a healthy closeness and emotionality, decided by the family themselves, and disengagement, which explains a Laissez-faire approach to child-rearing, usually to the extent of having no emotional closeness. Alliances/splits refer to the act of family members creating cliques with each other. This can often result in family members ganging up on ‘outsider’ members and can sometimes lead to the unintentional ostracization of that member.

Addiction

Addiction is described as seeking positive stimuli, despite negative consequences (3). When a person has an addiction, they prefer their addiction over anything else going on in their lives. As a result of this, those suffering from addictions, tend to unintentionally isolate themselves, and are often ostracized from friends and family. With addictions predisposition exists toward addictive and compulsive behaviors, as such it is important to treat the person, not just to change the addictive behavior, otherwise they may switch out one addiction for another.

Addiction is an extrinsically motivated disorder, usually leading to worsening states of anxiety, panic, paranoia, and disconnection. Therefore, part of treatment should use intrinsic motivation for becoming satisfied with life. This is where family can get involved in the therapy process, as they can learn how to reinforce positive intrinsic motivation within themselves to support each other’s motivation within and outside of the therapy sessions. By doing this, some of the isolation and ostracization may begin to reverse themselves.

Psychology

People have addictions when problems they are facing become burdensome, so they use their addiction to ignore the problem. Unfortunately, as bodies adapt to the highs experienced, it requires larger doses of the addiction to experience the high and delay the come down process. Addictions are often outgrowths of improper attachment, with addiction replacing the feeling of love and belonging. Another common reasoning for addictions, is to regain a sense of control in a life that feels out of control. With this, it is likely that the people turned to the addiction as an act of rebellion from the lack of control, telling themselves no one can tell me I can’t do this. This is common with teens from affluent families, who are involved with many rigorous activities for parents to feel a sense of accomplishment through their children.

Physiology

When a person has an addiction, the body responds to the high from participating in the addiction. This reaction stems from three neurotransmitters, cortisol, dopamine, and serotonin. Let’s use shopping as an example, when a person gets stressed their hormones elevate the levels of cortisol in their body, to cope with this increase, the person shops. The act of shopping decreases the cortisol levels, while increasing the reuptake of dopamine, to experience pleasure, and serotonin to experience happiness, once the dopamine and serotonin stabilizes to the point of homeostasis, the cycle is repeated, and a person will need to shop again.

Another neurotransmitter is norepinephrine, this increases the adrenaline levels to experience thrill and excitement, it is typically this feeling that is the addiction, with the source of the addiction simply being a preference on how to increase norepinephrine. It is for this reason that simply treating the addiction, may cause the person to trade one addiction for another, to get that thrill back. Therefore, it is important to
treat the cause of the addiction, not just the addiction itself. When the body is accustomed to the level of these neurotransmitters, it needs more of the addiction to reach the same level of pleasure. With that, when the person is not participating in their respective addiction, the neurotransmitters begin to return to hemostasis; once this is done over a prolonged period, the body enters the withdrawal process. Withdrawal is a process whereby the body reacts violently to lowered levels of the neurotransmitters it’s used to having copious amounts of. As a result of this, withdrawals can include, convulsion, aggression, febrile symptoms, sweat, severe dehydration, and hypoxia, which is when the skin turns pale and bluish from deprivation of oxygen.

**Families and Addiction**

When a person is going through an addiction, their whole family is affected by the toll it takes on the person. Because of this, treating people suffering from addiction needs to involve the family. In fact, addiction is comparable to a chronic disease; as a result of this, families cope with addictions in a similar manner to the way they would with chronic diseases, including maladaptive coping behaviors. Families often accommodate the person with the addiction, at times even helping to pay for the addiction and avoid intervening in order to not upset the member. Another factor that needs to be discussed regarding families and addiction is attachment. Improper attachment can lead to a hinderance in the ability to develop confidence and a sense of self while growing up. It is this lack of confidence and sense of self that may lead a person to form a dependency on an activity or substance that makes them feel good. As a result of this, work with families affected by addictions should focus on reforming and mending the bonds and attachment of the family.

Insecure attachment correlates to higher levels of anxiety and a tendency to avoid managing the anxiety. These behavioral patterns are common in people with addictions, who use their addiction as a tool to manage their anxiety. The idea that improper attachment can lead to addictions is not strictly social in nature. The combination of depression and long-term drug use leads to the deterioration of white matter in the brain, which holds the chambers of the brain together, and assists in carrying neurons throughout the brain and spinal cord. Deterioration of white matter can lead to severe hinderances in cognitive functioning and memory formation.

Compassion fatigue and secondary trauma are both common reasons for families to experience during rehabilitation. With compassion fatigue the family member is tired of the empathy that goes into supporting a person through addiction treatment. Secondary trauma generally happens during the withdrawal process of rehabilitation; this results from watching the events that occur during withdrawal. Not only can this experience be burdensome to the person going through it but watching someone you suffer can be equally traumatizing. When watching a person experience that kind of pain can cause some to leave because they do not want to witness it.

**Structural Family Therapy and Addiction**

Addictions are psychosomatic in nature, and has origins within the family, stemming from improper attachment and lack of clear boundary development. As this is the case, a combination of behavioral therapy (BT) and STF is encouraged when working with clients who have addictions, emphasizing the need to work with the family of the client during and after recovery. BT works on the symptoms of the addiction and teaches resisting set-backs and relapses. STF, works on the cause of the addiction and works with the clients and their families in order to assess where the dysfunction lies and how to form a healthy relationship with the client and their families. You and Park used STF with families whose child(ren) suffer from emotional and behavioral disorders (EBD). After 16 sessions the psychologists found improvements in family function, relationship, and a more positive prognosis for the children. Given the co-morbidity between EBD and addiction, this study shows STF is an effective strategy when working with families who suffer from an addiction.

Many addicts exhibit aggressive and violent behavior. This can cause alienation between the addict and his/her family and friends. This needs to be addressed and worked through while in therapy. Structural family therapy has been shown to be useful in helping families cope with these violent behaviors and can help to decrease dependency behaviors in clients with emotional and behavioral problems.

When working with clients that have addictions, one must explore how the family effects symptomology. They may negatively challenge the symptoms, causing the client to feel ashamed and guilty or be a beneficiary of...
the symptom, meaning that they gain something positive from that symptom, such as sympathy from peers, or the feeling of being the hero in the family.\textsuperscript{8}

All three dimensions of SFT are brought into the therapy process during sessions with both the person with the addiction and their family members. We first look at how boundaries change; often what we see with addiction(s) is the enmeshment boundaries, the parents of the siblings are too much into their business; trying to get them to stop, trying to change, trying to help with withdrawal. This unfortunately makes the client feel uncomfortable and not supported, but rather makes them feel like his/her life is out of their control. There is also have alliances and splits happening with family members of addiction, it can go one direction, whereby the person suffering the addiction is ostracized from the family unit due to the addiction and being a burden. However, you also have the other extreme, whereby the attention is focused solely on the person with the addiction, which may cause the other sibling(s) to be ignored and pushed aside in order to deal with the “problem”. As for hierarchy of power there’s a shift that occurs with addiction. Specifically, this could happen if a parent themselves is the one that suffers the addiction; when they were once a caring parent that provided order to the house and took care of the kids is now trying to take care of themselves and their addiction, thus making parental duties secondary\textsuperscript{3}. When working with people who have addictions, we must first look at the client’s history of the three dimensions before the addiction, discuss how the shift changed during the addiction, and work on how this is going to improve after recovery.

Conclusion

Addictions take a toll on a person, both mentally and physically. However, the family of that person is also affected, and as such needs to be involved in the healing process, from admittance of the problem, all the way to the last day of rehabilitation. The healing process, involving SFT, includes looking at and working through the dysfunctionality of the family, involving the three dimensions; hierarchy of power, boundaries, and alliances and splits. When it comes to addiction, major changes have occurred in the role that person takes in their family, including how they handle hierarchy of power, boundaries, and alliances and splits. As a result of this, the therapy process needs to acknowledge this new role, and how the role can be adjusted to be healthy for both the client and their family.

Source of Funding: Self

Conflict of Interest: No

Ethical Clearance: Obtained from research committee

References


A Preliminary Study of the Evaluation on the Dietary Pattern among Obese School Children

Norimah Said¹, Norazmir Md Nor², Siti Khuzaimah Ahmad Sharoni³

¹Postgraduate Student, PhD in Nursing, Centre for Nursing Studies, Faculty Health Sciences, Universiti Teknologi Mara (UiTM) Selangor, Kampus Puncak Alam, ²Deputy Dean & Lecture for Center for Nutrition and Dietetics, Faculty Health Sciences, Universiti Teknologi Mara (UiTM) Selangor, Kampus Puncak Alam, ³Koordinator of Institute of Neo Education (INED) Universiti Teknologi Mara (UiTM) & Lecture for Nursing Studies, Faculty Health Sciences, UiTM Selangor, Kampus Puncak Alam Universiti Teknologi Mara (UiTM), Malaysia

Abstract

The World Health Organization (WHO) has ranked Malaysia as the sixth country in Asia with the highest prevalence of obesity with 38% affecting children. The primary objective of this study is to evaluate the elements of dietary pattern related to behavior with regards to the food, environment, attitude, and knowledge of consumption pertaining fruit and vegetables; presenting a preliminary result. In this study, a quantitative method is utilized where questionnaires are distributed to 200 recipients from primary schools, aged 10 to 12-years-old, and 132 respondents have returned with feedback. This study, it is discovered that the school children are likely to consume more sweetened beverages such as soft drinks causing 67.6% of the school children to reflect an unhealthy score under health practice, 57.1% of them obtain an unhealthy score for their attitude towards snacking between meals and consuming sweet beverages and 85.7% of these recipients showcase low knowledge regarding healthy food such as fruits and vegetables. All the school children do not obtain a healthy score relating to the environment. The Body Mass Index (BMI) shows that water and fruit consumption have a significant relationship p-value >0.05. Therefore, the results of this study are beneficial to create a pre-requisite for the module development of health education centering on childhood obesity management.

Keywords: dietary pattern, healthy food, nutrition, obesity, school children

Introduction

Current trends in the world today has demonstrated the growth of an obese population especially among children. This phenomenon has posed a threat to human beings. The obesity among children often will convey into adulthood, and it also increases children’s risk in developing chronic diseases such as cardiovascular diseases, type 2 diabetes and others in their life¹.

An interactional cause of obesity could arise due to environmental factors, genetic predisposition, and human behaviour were is generally caused by a lack of physical activities, unhealthy eating, social factors such as socioeconomic status, race, ethnicity, media and marketing and the physical environment that influence energy consumption and expenditure²,³. Usually, school children in Malaysia have extremely packed schedules from morning which involves attending extra classes including religious classes. Consequently, they have limited time to play or be involved in sports.

Malaysia was ranked as the first top country that has the highest obesity rate in Asia in the year 2014⁴. This prevalence of obesity among children continues to grow up to 25% in the year 2015 among children aged 10 to 17-years-old as compared to 11.2% in the year 2011⁵.
One of the factors that contributes to the prevalence of obesity includes the dietary intake of school children who are likely to consume fast food; their diet lacking consumption of fruits and vegetables. In addition, adolescents and school children are recommended to consume at least three servings of vegetables and two servings of fruits daily. However, 93.7% of adolescents consumed less than the basic guidelines for vegetable intake, and 51.7% consumed less than two servings of fruits. Besides that, most of the school children aged 6 to 17-years-old informed that they skipped breakfast more than three times per week. They are also consuming an excessive amount of Energy-Dense Nutrients (EDNP) foods such as soft and sweetened drinks, fast and fried food, savoury crisps, confectionaries and spending less time with active physical behaviours. They are also unaware of the food consumption recommended by the Malaysian Food Pyramid. Relatedly, previous research revealed that children with better nutrition knowledge have healthier eating habits and a more positive attitude compared to children with poor nutrition knowledge.

This paper seeks to evaluate the dietary pattern among obese school children and to confirm the association between behaviour towards healthy food, environment, attitude, and knowledge related to BMI and prove the significance to develop the module of health education for childhood obesity management to be beneficial in creating awareness among primary school children.

**Method**

**Data collection**

A cross-sectional study has been conducted among obese school children. This study has been done at two primary schools located at a suburban area of Petaling Jaya, Selangor. The target population was overweight and obese school children aged 10-12 years old. The total number of populations is N= 200. The primary school children from age 10-12 years old were screened to measure their weight, height, and calculate their BMI. Children whose BMI are within range of being overweight and obese were selected as respondents in this study. Based on the BMI-for-age, if a child exhibits a standard deviation (SD) reading 1SD and +2SD reflects to overweight and if reading surpasses +2SD, they are considered obese school children. Furthermore, the sample size determination using Krejcie and Morgan’s Table, when the N=234, the sampling size is n=132. School children with severe disabilities or special needs and are active as athletes who categorise as obese were excluded from this study. In total, questionnaires were distributed to 132 samples among primary schoolers aged 10 to 12-years-old and returned with their feedbacks.

**Design of Questionnaire**

The structured questionnaire was adopted from the Modified Child Nutrition Questionnaire. The questionnaire was translated from English to Malay language by the researcher and then translated back to English to ensure the questions have the same meaning. A pilot study was conducted to validate the questionnaire and the value of Cronbach’s Alpha 0.835 was obtained, indicating that the questionnaire is reliable to be use. On top of that, this questionnaire was utilized with the permission of the original author. The scoring for each item and summation was made by totaling items specific to each category as such in the Table 1 to indicates the health target score for five categories.

**Table 1. The healthy target score for five categories; dietary pattern, healthy behaviour, attitude, environment, and knowledge**

<table>
<thead>
<tr>
<th>Category score</th>
<th>Target healthy score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dietary pattern: Noncore food</td>
<td>≤ 1</td>
</tr>
<tr>
<td>Sweetened beverages</td>
<td>≤ 1.3</td>
</tr>
<tr>
<td>Sweetened beverages – diet soft drink</td>
<td>≤ 1.3</td>
</tr>
<tr>
<td>Water</td>
<td>3.5</td>
</tr>
<tr>
<td>Fruit</td>
<td>≥ 6</td>
</tr>
<tr>
<td>Vegetable</td>
<td>≥ 6</td>
</tr>
<tr>
<td>Healthy behaviour</td>
<td>≥ 18</td>
</tr>
<tr>
<td>Attitude: Fruit and vegetable</td>
<td>≥ 16</td>
</tr>
<tr>
<td>Environment: Fruit and vegetable</td>
<td>≥ 16</td>
</tr>
<tr>
<td>Knowledge: Fruit and vegetable</td>
<td>8</td>
</tr>
</tbody>
</table>

Sources: adapted from Wilson, A. M., Magarey, A. M., & Mastersson, N (2008).

**Data Analysis**

All the data will be converted to Statistical Package for Social Science (SPSS) version 22.0. Descriptive statistics were used to determine the dietary pattern, healthy food behaviour, environment, attitude, and
knowledge in relation to BMI

Result and Discussion

EFFECT OF DEMOGRAPHIC OF OBESE PHENOMENON.

A total of 132 respondents made up the samples for this study aged 10 to 12-years-old. A majority of the respondents were girls with 71 or 53.6% followed by boys with 61 respondents or 46.4%. Ages of the subjects ranged from 10 to 12 years old with 28.6% of 10 years old, 32.1% of 11 years old, and 39.3% of 12 years old. Meanwhile, 53.6% of the respondents had a BMI that was overweight and 46.4% were obese.

DIETARY PATTERN, HEALTHY FOOD BEHAVIOUR, ENVIRONMENT, ATTITUDE AND KNOWLEDGE FOR OBESE SCHOOL CHILDREN

Table 2 illustrates the frequency of dietary pattern, healthy behaviour, attitude, environment, and knowledge. The dietary pattern was divided into five categories such as consumption of non-core food, sweetened beverages, diet soft drink, water, fruit, and vegetable. The non-core food consumption result shows that 119 overweight and obese school children obtained an unhealthy score with the percentage of 90.7%. It is only 16 overweight and obese school children who have obtained a healthy score with the percentage of 7.1% for the consumption of non-core food. Moreover, the sweetened beverages result showed that 71 or 53.6% of the overweight and obese school children obtained the unhealthy score and 61 or 46.4% obtained healthy score that regarding less consumption on the sweet beverages. Not only that, 122 or 92.9% of the overweight and obese school children obtained an unhealthy score on the consumption of sweetened beverages of diet soft drink and 10 or 7.1% of the overweight and obese school children obtained an unhealthy score. Meanwhile, the intake of water data shows that 71 overweight and obese school children obtained a healthy score with the percentage of 46.4% and 71 obtained unhealthy score with the percentage of 53.6%. Besides that, for the consumption of fruit, all the overweight and obese school children obtained an unhealthy score. Lastly, for the consumption of vegetable category, 5 overweight and obese school children obtained a healthy score with the percentage of 3.6% and 127 overweight and obese school children obtained an unhealthy score with the percentage of 96.4%.

The practices of the overweight and obese school children related to healthy food behaviour show that a majority of them obtained unhealthy score with 90 or 67.9% and only 42 or 32.1% of them obtained a healthy score. Furthermore, the attitude category for the overweight and obese school children on consumption of fruits and vegetables shows that 75 of them obtained a healthy score with percentage 57.1%, and 57 overweight and obese school children obtained an unhealthy score with percentage 42.9%. The environment factor that influences the consumption of fruit and vegetables shows that all of the overweight and obese school children obtained unhealthy score.

The knowledge related to fruit and vegetables shows that 19 overweight and obese school children obtained a healthy score with the percentage of 14.3%. Furthermore, 113 of them obtained an unhealthy score with the percentage of 85.7%. An increase in knowledge and understanding of nutritional concepts does not necessarily lead to a positive change in making choice of healthy food because people need the extra time to change their preference of food and eating habits. Furthermore, the nutrition knowledge and education will provide enhancements on knowledge on healthy food and then change the attitudes and practice among overweight and obese school children.
Table 2. The frequency of dietary pattern, healthy behaviour, attitude, environment, and knowledge for pre-test, post-test 1 (after programme), and post-test 2 (4 months after programme)

<table>
<thead>
<tr>
<th>Category</th>
<th>No of the student (percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Healthy (percentage)</td>
</tr>
<tr>
<td>Dietary pattern:</td>
<td></td>
</tr>
<tr>
<td>Noncore food</td>
<td>16 (9.3%)</td>
</tr>
<tr>
<td>Sweetened beverages</td>
<td>61 (46.4%)</td>
</tr>
<tr>
<td>Sweetened beverages: diet soft drink</td>
<td>122 (92.9%)</td>
</tr>
<tr>
<td>Water</td>
<td>61 (46.4%)</td>
</tr>
<tr>
<td>Fruit</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Vegetable</td>
<td>5 (3.6%)</td>
</tr>
<tr>
<td>Healthy behaviour</td>
<td>42 (32.1%)</td>
</tr>
<tr>
<td>Attitude: Fruit &amp; vegetable</td>
<td>75 (57.1%)</td>
</tr>
<tr>
<td>Environment: Fruit &amp; vegetable</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Knowledge: Fruit &amp; vegetable</td>
<td>19 (14.3%)</td>
</tr>
</tbody>
</table>

The relationship between BMI with dietary pattern, healthy food behaviour, environment, attitude and knowledge of overweight and obese children.

This study examines the relationship between BMI with dietary pattern, healthy food behaviour, environment, attitude and knowledge of overweight and obese children. Table 3 tabulates, the healthy score of intake water with BMI and illustrates the association as p-value which is 0.004 (p<0.05). The data shows that a significant number of obese school children obtained a healthy score on water intake.

The consumption of fruit in dietary pattern group, the data also showed significance with BMI as p-value is 0.046. The relationship of the BMI with non-core food (p=0.157), sweet beverage (p=0.467), sweet beverage-diet soft drink (p=0.564), vegetable (p=0.059), healthy food behaviour (p=0.366), attitude (p=0.405), environment (p=0.083) and knowledge (p=0.705) are not associated with BMI as the p-values are greater than 0.05. Thus, the data showed that water and fruit consumption have a significant relationship with BMI.

As generally, this study shows BMI is associated with dietary pattern. This indicates that dietary intake influenced the BMI of the overweight and obese school children. The result revealed that the children do not practice healthy eating. The types of food intakes were related to BMI such as sweet drinks, fried rice, fried beef. This study identified a weak association of BMI with fruit consumption. This indicates that their intakes were still below the National Recommendation of five servings of fruit and vegetables daily. This is also lower than WHO population goals where the children need to eat more than 400 g of fruit and vegetable daily. The majority of the children reported not consuming fruits, legumes, or dairy every day. This study shows that a low intake of vegetable could be due to food neophobia and dislike of the taste of vegetable amongst school children. Meanwhile, mothers play a vital role in fighting childhood obesity and the mother needs to be motivated and understand healthy eating patterns and exercise that helps her child lead a healthy life. The relationship between food knowledge, preferences, diet, and subsequently with weight status; showed that better food knowledge indicates healthier food preferences and, in conclusion, lead to healthier food choices that are mirrored by a normal weight status. This is concurrent with a previous study in the United States that found children consumed high fast food had a lower intake of milk, dairy, and fruits.
Table 3. BMI relationship with the dietary pattern, healthy food behaviour, attitude, environment, and knowledge.

<table>
<thead>
<tr>
<th></th>
<th>(BMI) Mean (SD)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-core food</td>
<td>1.92 (0.26)</td>
<td>0.157</td>
</tr>
<tr>
<td>Sweet beverage</td>
<td>1.53 (0.51)</td>
<td>0.467</td>
</tr>
<tr>
<td>Sweet beverage –diet soft drinks</td>
<td>1.07 (0.26)</td>
<td>0.564</td>
</tr>
<tr>
<td>Water</td>
<td>1.53 (0.51)</td>
<td>0.004</td>
</tr>
<tr>
<td>Fruit</td>
<td>2.00 (0.00)</td>
<td>0.046</td>
</tr>
<tr>
<td>Vegetable</td>
<td>1.96 (0.18)</td>
<td>0.059</td>
</tr>
<tr>
<td>Healthy food behaviour</td>
<td>1.68 (0.48)</td>
<td>0.366</td>
</tr>
<tr>
<td>Attitude</td>
<td>1.43 (0.50)</td>
<td>0.405</td>
</tr>
<tr>
<td>Environment</td>
<td>2.00 (0.00)</td>
<td>0.083</td>
</tr>
<tr>
<td>Knowledge</td>
<td>1.86 (0.36)</td>
<td>0.705</td>
</tr>
</tbody>
</table>

**Conclusion**

This study is beneficial to evaluate the overweight and obese school children’ knowledge, attitude, and eating behaviour and number of obesities among children of 10 to 12 years old in the school. Furthermore, this study gives the ideas for the nursing practice or School Health Nurse (SHN) to plan their health education related to nutrition and physical activity but also to plan school intervention programs to overcome obesity among overweight and obese school children. It will also motivate the government or Non-Government Organization (NGO) to take precautions of obesity epidemic in Malaysia. The health education module or intervention program related to childhood obesity will gives a positive impact while providing children with good nutrition knowledge, improving attitudes and healthy eating habits among the children themselves. This future study can highlight the most useful and accurate results for the research needed by the school, government body and the intervention programme to enhance the knowledge, attitude, and practice among overweight and obese school children.

**Ethical Consideration:** In this study, the children’s parent was given the consent as permission for their children to answer the questionnaire. The parents have their right to decide in allowing the children to get involved in this research and was return to the researcher. Researcher must keep the confidentiality of the participants. This study also was obtained the approval from Ministry Education, Malaysia and State Education Department Selangor.

**Acknowledgment:** Special thanks to Nur Sitarun Nisa Misbah (2013221696), Siti Mardhiyah Muhammad (2013268478), Universiti Teknologi Mara, Ministry Education and State Education Department for the permission.

**Source of Funding:** Self-funding

**Conflict of Interest:** Nil

**References**


Examining a Model to Measure Green Packaging Practices Among Consumers in Malaysia: A Sustainable Contributor to Achieving Smart Environmental Goals

Chinnasamy Agamudai Malarvizhi¹, Sreenivasan Jayashree², Shamima Raihan Manzoor³

¹ Senior Lecturer, ² Associate Professor, ³PhD Student, Faculty of Management, Multimedia University, Malaysia

Abstract

This study primarily aims to test the factors in the extended Theory of Planned Behavior (TPB) model and their impact on green purchase intention and green buying behaviour towards green food packaging practices in Malaysia. The research hypotheses are tested accordingly among the restaurants and cafeterias in various places of Selangor, Malaysia. A total of 164 usable sample responses were collected from working and student population in Malaysia by using a self-administered questionnaire based on convenient sampling method. The outcomes of the study reveal that the environmental attitude and internal perceived behaviour have a significant positive impact on green purchase intention. Further results in this research show that subjective norms and external perceived behavioural control also have a substantial impact on green buying behaviour in favour of green food packaging in Malaysia. The finding of this study contributes to the Malaysian government’s environmental policy-making which aims to encourage pro-environmental change among people and business groups for achieving smart environmental goals through their green purchase intention and green buying behavior.

Keywords: Green food packaging, Consumer behavior, Theory of planned behavior

Introduction

Environmental concerns about food production and consumption have become increasingly prominent, which is evidenced by the “dramatic rise in sales of organically produced food products in many countries”.¹³,²⁷ Marketers realize that packaging performs an important role in marketing communications and could be one of the most important factors influencing consumer purchase decision. The combination of green and packaging would be a new choice for consumers in developing markets like Malaysia. In this country, like many other developing countries with abundant resources and minimal development pressures, little attention was paid to growing environment protection and conversation. As far as green packaging is concerned, it is a very new concept in Malaysia. As of today there has been little empirical research on Malaysians’ attitudes and purchasing intention toward green packaging of food items.

The environment issue is often associated with materials used in food packaging. The process of recycling plastic material is more difficult and costly in comparison to other materials.²⁸ Moreover, landfill space is needed for an increasing amount of packaging waste. So the solution needs to be found in a proper model of measuring and influencing customer intention and behaviour towards greed food packaging. This has led to the research question about the factors in TPB that influence the green purchase intention and behavior towards green food packaging in Malaysia. To complement with the research question, the objective of this study is formulated to test the TPB factors that influence the green purchase intention and behavior towards green food packaging in Malaysia.

Corresponding author:
Shamima Raihan Manzoor
PhD Student, Faculty of Management, Multimedia University, Malaysia.
Email: 1161402023@student.mmu.edu.my

DOI Number: 10.5958/0976-5506.2019.00913.6
Literature Review

According to Garnett, food waste affects the environment via its decomposition after disposal in landfills and by the embedded emissions associated with the production, processing, transport, and retailing of food. In Malaysia, “food waste generation in 2002 was reported to be 7,650 tonnes per day. This value is expected to reach 13,500 tonnes per day by 2020.”

Product’s packaging and labelling is often considered as something paid attention to by the consumers. In Malaysia, the most popular food packaging is by polystyrene containers and plastic. Polystyrene containers are non-biodegradable, and studies show that they have harmful side effects when it migrates from the containers onto food primarily from leaching caused by heat. Benzene, a material used in the production of polystyrene, is a known carcinogen and poses a potential risk to human health.

Several studies have adapted attitude models to explain the impact of norms, social influence, and behavioural control on green buying behaviour. In this regard, the ‘theory of planned behaviour’ (TPB) is a widely used attitude model for examining relationships between personal, social norms, and beliefs of individuals with their green buying.

The TPB has added the concept of ‘perceived behavioural control’ (PBC) to the TRA as a third predictor of intention. PBC refers to the perceived ease or difficulty of performing a particular behaviour. Ajzen proposes that personal behaviour depends on behavioural intention, which is guided and predicted by three determinants: the attitude towards the behaviour, the social subjective norm, and the PBC. The TPB posits that positive attitude to increased pressure from social influences (i.e. social norms) and increased control over behaviour leads to increased behavioural intention.

Specifically, in Malaysia, there is limited information about consumers’ perceptions and their practices towards going green. Manget et al. have discovered that almost half of the respondents in a multi-country survey indicate that green products offer comparable or superior quality over conservative alternatives.

Methodology

For this research, the researchers have focused on the two categories of population in Malaysia: students and working people. This is because these two groups of people need to depend on packaged food more than others as they have to remain outside their houses due to study or work-related duties they have less time to cook their breakfast, lunch and dinner at home. Selangor state was chosen to conduct the survey for this study due to its urban and adequate population. Environmental Attitude was operationalised by taking four items from the former studies of McCarty and Shrum and Tanner and Kasti. Subjective norms, internal perceived behavioural control, external perceived behavioural control were

Green purchase intention (GPI) was measured by using a five-item scale from Paul et al.\textsuperscript{21} Green buying behaviour items were taken from Ahn et al.\textsuperscript{1}. A 5-point Likert-scale was utilized to measure all the variables. A self-administered questionnaire was distributed by the researchers using convenient sampling method. A total of 164 usable complete questionnaires were used to analyse the data. Bagozzi & Yi\textsuperscript{8} mentioned that the sample size for a study should be above 100. The data were analysed using Statistical Package for Social Sciences (SPSS) version 22.

**Results**

Among the analysed respondents (N=164), 56.7% are female, and 43.3% of them are male. 71.3% of the respondents are students and 28.7% are working people. Table 1 shows that the R-square value = .352. This means 35.2% of the variation in purchase intention is accounted for by the variation in external perceived behavioural control, environmental attitude, subjective norms, and internal perceived behavioural control.

**Table 1: The R-square value with green purchase intention as dependent variable**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.593\textsuperscript{a}</td>
<td>.352</td>
<td>.336</td>
<td>.483</td>
<td>.352</td>
</tr>
<tr>
<td>1</td>
<td>.593\textsuperscript{a}</td>
<td>.352</td>
<td>.336</td>
<td>.483</td>
<td>.352</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a.} Predictors: (Constant), ExtPerBehavC, EnvAttde, Sub_Norms, IntPerBehavC

\textsuperscript{b.} Dependent Variable: GPI

**Table 2: Standardised and unstandardized coefficients**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>T</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.04</td>
<td>0</td>
<td>.363</td>
</tr>
<tr>
<td>EnvAttde</td>
<td>.452</td>
<td>.087</td>
<td>.386</td>
<td>5.205</td>
</tr>
<tr>
<td>Sub_Norms</td>
<td>.094</td>
<td>.061</td>
<td>.117</td>
<td>1.536</td>
</tr>
<tr>
<td>IntPerBehavC</td>
<td>.171</td>
<td>.069</td>
<td>.193</td>
<td>2.466</td>
</tr>
<tr>
<td>ExtPerBehavC</td>
<td>.046</td>
<td>.057</td>
<td>.057</td>
<td>.806</td>
</tr>
</tbody>
</table>

\textsuperscript{a.} Dependent Variable: GPI

The regression equation based on Table 2 is as follows:

Green Purchase intention =
Norms) + 1.171(ExtPerBehavC) + .046(ExtPerBehavC)

Table 3 below shows that the R-square value = .282. This means 28.2% of the variation in green buying behavior is accounted for by the variation in external perceived behavioural control, environmental attitude, subjective norms, and internal perceived behavioural control.

**Table 3: The R-square value when green buying behaviour (GBB) as the dependent variable**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Change Statistics</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.531*</td>
<td>.282</td>
<td>.264</td>
<td>.711</td>
<td>.282</td>
<td>15.591</td>
<td>4</td>
<td>159</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), ExtPerBehavC, EnvAttde, Sub_Norms, IntPerBehavC

b. Dependent Variable: GBB

**Table 4: Standardised and unstandardized coefficients**

<table>
<thead>
<tr>
<th>Model B</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig. Zero-order</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td></td>
<td>Partial</td>
<td>Part</td>
</tr>
<tr>
<td>(Constant)</td>
<td>.187</td>
<td>.533</td>
<td>.351</td>
<td>.726</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EnvAttde</td>
<td>.126</td>
<td>.128</td>
<td>.077</td>
<td>.987</td>
<td>.325</td>
<td>.078</td>
</tr>
<tr>
<td>Sub_Norms</td>
<td>.380</td>
<td>.090</td>
<td>.339</td>
<td>4.232</td>
<td>.000</td>
<td>.477</td>
</tr>
<tr>
<td>IntPerBehavC</td>
<td>.134</td>
<td>.102</td>
<td>.108</td>
<td>1.309</td>
<td>.193</td>
<td>.363</td>
</tr>
<tr>
<td>ExtPerBehavC</td>
<td>.189</td>
<td>.084</td>
<td>.167</td>
<td>2.248</td>
<td>.026</td>
<td>.342</td>
</tr>
</tbody>
</table>

a. Dependent Variable: GBB

The regression equation based on Table 4 is as follows:

Green buying behaviour = 1.176 + 1.267(EnvAttde) + 3.80(Sub_Norms) + 1.34(IntPerBehavC) + 0.189(ExtPerBehavC)

Based on Table 4 subjective norms(p value=.000<0.05) and external perceived behavioral control(p value=.026<0.05) have significant positive impact on green buying behavior.

**Conclusion**

In conclusion, this study addresses a significant gap in analysing customers’ green purchase intention and green buying behaviour towards green food packaging in Malaysia as a part of consumers’ adoption of sustainable practices through the use of Theory of Planned Behavior²⁻⁴.
Based on this study’s outcomes, it is clear that the environmental attitude and internal perceived behavioural have a significant positive impact upon green purchase intention. This finding is also in line with the previous researchers like Chan & Lau and Seung Bong Ko & Byoungho Jin. Further results in this research show that subjective norms and external perceived behavioural control have substantial bearing on green buying behaviour towards green food packaging in Malaysia. This result is also supported by the findings of the previous researchers Biswas & Roy, Jin & Kang, and Seung Bong Ko & Byoungho Jin.

From a practical viewpoint, pro-environmental attitude among the customers needs to be nurtured in the society. Moreover, various initiatives of the restaurant business owners and food packaging manufacturers along with the support of the Malaysia Government as a whole can create a big difference in the society. Finally, the unsustainable practices triggered by wasteful runaway consumerism will be reduced if each individual makes small changes to his or her lifestyle and consumption habits by selecting green food packaging services practiced by the restaurants and cafeterias. Thus, each individual can make a worthy contribution to achieve smart environmental goals in Malaysia.

Notes:

The paper is extracted from a research project of the Faculty of Management, Multimedia University Malaysia.

No Conflict of Interest was found between the authors.

Source of Funding: Self

Ethical Clearance: Was not required by the assigning university.

References


Role of Personality Traits in Sexual Misconduct among Malaysian Teenager

Aminah Binti Abdul Mannan¹, Aqeel Khan², Jamaludin Bin Ramli², Adibah Bint Abdul Latif ¹, Ayesha Binti Abdul Mannan³

¹Master Research Student, School of Education, University Tecknologia, Malaysia (UTM), Johor Malaysia, ²Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, ³PhD Student, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Abstract

Many studies have been conducted to examine the involvement of adolescents in sexual misconduct; however, through a literature review conducted, studies on teenage personality traits and sexual misconduct are found to be limited in Malaysia. Teenagers are easily trapped by sexual misconduct due to the process of change between childhood and adulthood. The role of personality traits, religiosity, cultural values of adolescents highlighted to shape the character of youth, which can help to build positive personality for becoming good citizen of the country. As Malaysia consists of Malay, Chinese and Indian diverse cultural societies and diverse religious people living together harmoniously in Malaysia, which has absolutely noble values to develop healthy personality; however, sexual misconduct emerging as challenge, which need to be understand in terms of unregistered pregnancy and social issues. By developing positive values and healthy personality among teenager could serve as best predictor for avoiding sexual misconduct.

Keywords: Personality, Sexual Misconduct, Teenager, Malaysia

Introduction

In this era of modernization, adolescents are involved with a variety of negative activities that contribute to the occurrence of negative social issues that are widely increasing day by day. This issue is not only happening in Malaysia, but this problem also exists globally and its challenge in the development of human civilization (Faizal & Zaki, 2014; Khan) ¹, ². Sexual misconduct among teens is growing social problem around the world regardless of the status of a country, whether developed countries or developing countries ³. In developed countries such as America, adolescents involved in social misconduct are defined as juvenile offenders who live in a social environment that is different from their previous generation. Exposure to various causal factors is either directly or indirectly negatively affecting the development of adolescent psychology, and at the same time encouraging them to participate in social misconduct. This situation becomes more severe when these adolescents face difficulty in changing or removing themselves from these negative effects despite undergoing recovery ⁴. Obtaining 50 percent of teens in America under the age of 17 are actively involved in sexual intercourse ⁵.

In addition, Wendy et al. ⁶, conducted a study of 4135 American Indian teenagers aged between 13 and 18 in Minnesota. Based on the study, 40 percent of teenagers aged between 13 and 15 years old and 69 percent of teenagers aged 16 to 19 have had sexual intercourse. As regards the phenomenon of rising teenage cases in the United States, researchers have pointed out that increased public recognition of out-of-date pregnancies has eliminated the stigma of birth of a child out of wedlock as before⁷. Between the 1950s and the 1960s, more than a teenager who was born out of wedlock would get married before their birth.

DOI Number: 10.5958/0976-5506.2019.00914.8

Corresponding author:
Aminah Binti Abdul Mannan
Master Research Student, School of Education, University Tecknologia, Malaysia (UTM), Johor Malaysia. Email: aminahfp@gmail.com
The term adolescents refers to a stage of transitional development from childhood to adulthood and experienced significant physical changes related to puberty and also significant cognitive and social changes. Adolescents are adapting to many changes, such as body shape, sexual maturity and social status. This can run smoothly and involve minimum pressure if the most important person in teens’ life provides the necessary support. Teenagers are easily trapped by sexual misconduct due to the process of change between childhood and adulthood. At this stage, adolescent emotions are somewhat unstable, so they are easily pushed with a push towards fulfilling sexual desires. The most significant problem in teen sexual misconduct is the willingness of the adolescent to the effects of these sexual activities while they are still not physically, mentally and economically.

Sexual Misconduct among Teenager

Sex is a basic necessity in human life, without sexuality human civilization will not grow. Sex is seen as a major internal force in directing and influencing human behavior. This means that sex also involves teenagers. The adolescent stage is one of the stages of human development. This is a phase of change or transition from childhood to teenage level which includes biological changes, psychological changes and social change.

There are various factors, which contribute to the increasing sexual misconduct among adolescents throughout the country were discussed by many researches. Additionally, the cause of the increasingly dramatic social spread of the disease has been identified as well as various modules are formulated as a guideline that involves the role of responsible parties as a means of curbing these symptoms. However, every day the malnutrition among teenagers in Malaysia continues to increase. Lack of identity leads to a lack of self-control. When a person loses control over himself, then the individual easily loses direction and then becomes involved with negative elements.

Teenagers in Malaysia are defined as individuals between the ages of 15 and 30 years and this definition has been fully utilized starting in 2018. Statistics by the Department of Statistics, Malaysia (2017) show that Malaysia’s total adolescents between the ages of 15 and 29 in 2016 are 9.3 million people out of the total 31.7 million people in Malaysia. The present scenario shows the growing rate of sexual misconduct among adolescents. Every day many sexual misconduct news reported especially among under-aged teens. There are many crimes committed by adolescents found to be related with involvement of sexual misconduct.

This act in turn contributes to the rise of the case of an out-of-date pregnancy. National Registration Department statistics. From 2000 to July 2008 records show more than 257,000 registered birth certificates without the name of the father. This means that an average of 2,500 cases of out-of-date children are recorded monthly or almost 84 cases per day. The breakdown of birth-offs by state between 2000 and 2008 showed that 70,430 unmarried children were registered. Selangor recorded the highest number of 12,836 babies. This followed Perak (9,788), Kuala Lumpur (9,439), Sabah (8,435), Negeri Sembilan (4,108) compared to Sarawak (617) and Terengganu 574 people. Registration by ethnicity shows the highest number of Malays and Bumiputera in Sabah and Sarawak at 20,949 babies, India 19,581 and China 18,111. Religious breakdowns are 30,978 Muslims, 18,085 Hindus, 17,236 Buddhists and Christians 3,395 people (UKM news portal, June 2010). The out-of-date pregnancy case recorded an increase between 2011 and 2014 where 71,619 cases were registered. In 2011, 18,656 cases were recorded to 18,847 (2012), down to 17,588 (2013) and 16,528 (2014).

The researcher studied about pregnant teenagers without marriage at Nur Hasanah Kuala Lumpur House. The findings showed that the family background and the way the problems are addressed by adolescents with their families and forms of care received after the pregnancy has had an impact on the development of adolescent personality.

The Ministry of Health statistics in 2016 recorded 3980 teenagers or 28.8 percent of 13,831 teenagers aged between 10 and 19 years old. The statistics recorded five states which recorded the highest number of teenage pregnancies in Sabah with a total of 3,084 cases, followed by Sarawak 2,910 cases, Selangor 1,461 cases, Johor 1,319 cases and Pahang of 940 cases. Based on the study of Mohammad Sabran (2003), in Malaysia more than 300 teenagers aged between 13 to 25 years are involved with sexual misconduct and free sex resulting in pregnancy and subsequently abortion.
Many studies have been conducted on sexual misconduct more focused on religious, sociological and environmental aspects. The appreciation of religious values should also be emphasized and applied in the adolescents to shape the character of a superior youth. Studies found that parents contributed to the problems of children’s behavior, which failed to show good behavior in front of their children in addition to ignoring religious teachings. This study proves the involvement of adolescents in social problems is caused by lack of spiritual practice such as performing worship.

**Personality Context**

All adolescent behavior and personality are influenced by the elements within themselves. Al-Ghazali explains that there are three factors that influence one’s personality, heart, lust and sense. In humans (adolescents) there will be interactions between heart, lust and reason. When a tadabbur is mixed with the heart and lust of mardiah, it will create a superior youth personality. However, when the adolescent has the intellect, the heart of obligation and mutmainnah, it will form a balanced youth personality. While teenagers who have common sense, qalban heart and ammarah appetite will give birth to teenage personality.

According to Eysenck personality is a picture of a person’s behavior that is consistent, unique and dynamic. Consistent and consistent means that one’s behavior is unchanged. The personality of the baby’s realm, the stage of childhood, teenage, adult and old are similar. If a person has hard-heartedness and ego at the stage of childhood and adolescence, the nature and attitude will be brought to the old age or to the grave. Changes that occur from the environment only affect the personality, not the overall effect. While Carl Rogers states that personalities are closely related to self-concept, which is how individuals learn about the advantages and disadvantages and feedback from others about themselves. Personality is related to an individual’s environment, where the element of assessment and physical influences on it.

Adolescents are the natural resources of the country and will play an important role in shaping the political, economic and social future of a country. “The youth of the nation’s hope, the country’s pioneers”, this proverb clearly shows how important the role of youth in a country. Adolescents are considered the most productive and passionate in all respects. Quality teenagers can empower the glory of nation and nation. Therefore, every teenager needs to play their part with the responsibility to plan the development of the country. More than half a century we have gained a sense of independence, but teenagers who are the backbone of the country are still plagued by various social troubles. It can be seen that youth mentality in our country has not yet undergone a paradigm shift in line with the flow of our nation’s development. The present scenario shows the rising rate of social misconduct among adolescents. Every day we are served with a variety of sexual misconduct news especially among under-aged teens where this situation has sparked the concern of all parties.

Case studies involving sexual misconduct such as rape, discharge of pregnant and pregnant children out of wedlock show a significant increase from year to year. Utusan Malaysia dated September 10, 2016, in 2015, a total of 3,980 adolescents and youth aged between 10 and 19 years of age have been pregnant with extramarital children. Meanwhile, reports from the Royal Malaysian Police (PDRM) show that the number of baby dumping in Malaysia is 432 cases from 2011 to June 2015 with out-of-pregnancy pregnancy which is the main cause of the growing baby’s cure. PDRM also reported that the lack of awareness on sex knowledge has also been a major cause of rape cases statistics (Utusan Malaysia, September 10, 2016). According to statistics released by (PDRM), 93.5 per cent of victims from 12,473 rape cases in 2011 to June 2015 involved teenagers aged between 13 and 18 years old.

This study showed that the behavior in early adults have studied the effects of certain psychosocial variables (eg norms, attitudes and self-efficacy) on risky sexual behavior, personality can also be important determinants of sexual behavior. While according to Hoyle, Fejfar, and Miller, in particular, impulses seeking sensation and decision are the two main personalities often associated with high-risk sexual activity. Hence, an assessment of the psychological characteristics of individuals is important to identify the tendency of a person to enable them to be caught in the case of sexual misconduct.

Through this study, enlightenment and uncertainty regarding the traits of adolescent personality involved in sexual misconduct will be identified. Five personality traits, assertiveness, concern, integrity, cross culture and delinquency will be analyzed to identify key personality
tricks that contribute to adolescent involvement in sexual misconduct. Subsequently, the findings will assist counselors in designing systematic and more focused interventions after recognizing the teenage personality involved in sexual misconduct. In addition, counselors are also able to interact more effectively with adolescents who may be at risk for sexual misconduct to help them avoid temptations of wrongdoing. Disclosure of knowledge regarding the involving personality of the adolescent is important because there is a difference between the personalities of teenagers now as compared to the past. This is due to the revolution in society at large; therefore counseling adolescents now requires a different approach.

**Conclusion**

Positive personality building is important in building integrity, attitudes and good behavior. Failure to build a good personality causes one to make wrong and harmful choices. In this regard, present research paper showed role of personality traits and sexual misconduct among adolescents. This issue is substantiated by the increasing number of cases of sexual misconduct among adolescents and consequently, the personality traits leading to sexual misconduct among teenagers.

**Ethical Clearance**- Done by own Interest and with research committee

**Funding:** None

**Conflicts of interest:** None

**References**

Overcome the Problem of Street Children Through Life Skill Learning in West Java Indonesia

Herwina Bahar¹, Zainudin Hassan², Iswan¹, Hanny Firas¹
¹Lecturer, Education Faculty of Muhammadiyah University of Jakarta, ²Associate Professor, School of Education, Universiti Teknologi Malaysia, Johor, Malaysia

Abstract

This study aims to provide solutions to the problems of street children through Life Skill learning. The research was conducted at Master Depok Primay School, Indonesia. 20 children are active as street children to fulfill their daily needs as family economic demands. Qualitative Research Methods, are case studies, involving teachers who play a role in developing life skills, they are two class teachers and two life skill teachers. Determination of research subjects was carried out by using purposive sampling technique, the results were specifically street children 9 people, five people in grade 4 and four people in grade 6. The techniques of collecting data were through observation, structured interviews, and study documentation. The results showed that street children in Depok Master School were included in the children on the street group, it means, children who had economic activities as child laborers on the road, but they still had strong relationships with their parents. Part of their income on the road is given to their parents. To overcome these problems, the life skill learning process is very instrumental in the life process of street children, for this reason a teacher’s strategy is needed in creating and innovating by continuing to improve pedagogical, personality, professional and social competencies. Support from various parties is needed to participate, both the government and the community to continue to provide guidance and supervision to parents that the act of releasing and letting children on the road, especially demanding them as breadwinners is illegal and violates children’s rights.

Keywords: street children, life skills learning, children’s rights, social problems

Introduction

Depok City Central Bureau of Statistics (BPS), Indonesia noted that the number of neglected children in Depok increased, in 2012 was as many as 49 children while in 2011 was only 30 children. Head of Regional Balance Sheet and BPS Analysis of Depok City Bambang, researcher¹ said that most neglected children were caused by family economic factors, but some are caused because they prefer to live on the streets. The children living on the streets are especially vulnerable to victimization, exploitation, and the abuse of their civil and economic rights (Shahina, 2014).

Street children in Depok City, Indonesia are mostly migrants, the number of street children tend to reducing because of the number of raid programs carried out by the Civil Service Police Unit¹. In 2012, there were only 336 street children, the number decreased from 2011 totaling 430 children. Their involvement in the informal economy sector usually produces a sense of pride and worth because of their ability to contribute to welfare of family. For example, working as a hawker at stations, terminals, selling newspaper, shining shoes, looking for used goods or garbage, traffic light busking, car washers, renting umbrella, and many of them doing criminal to get money. Like child labor in general, street children often start living on the streets at a very young age. These are either “children on the street”, who are engaged in economic activities, but who mostly still go home, or “children of the street”, who live on the streets, but still have occasional contact with their parents.

But this is also proven to eliminate the interest of children to school because they want to get more money. Intervention needs to emphasize three types of change: (a) in awareness of street life for those making little use of the streets; (b) in the capabilities of those using the street as a major resource; and (c) of the condition of those totally dependent on the street environment.

One of the rights of street children is to obtain proper education as stated in Law Article 31 paragraph 1 that education is a right for every citizen. But to deal with the problems of street children must be admitted is not an easy thing. During this time, various actual efforts have been made, both by NGOs, government, professional organizations, and social as well as every person to help street children come out or at least slightly reduce their suffering. In the Convention on the Rights of the Child which has been ratified by the Government of Indonesia, it is stated and recognized that children are essentially entitled to obtain proper education and they should not be involved in economic activities early as stated in Law Number 23 of 2002 concerning Child Protection. However, because everything is done temporarily, segmented, and separated, the results are less than optimal.

The review of Education Environment stated the school, and community environment. Therefore, the role of the school, especially the teacher’s contribution, becomes the supporting force in the progress of the nation’s children. The Master School or Yayasan Bina Insan Mandiri (YABIM) in Depok, West Java is an institution that is engaged in the formal school field, which does not charge a single fee. One of the treatments that is often used is by providing training in the form of life skills accompanied by attitudes, behaviors, and motivations which needed by students at facing life problems.

Life skill learning in the Depok Master School, especially at the Primary School level, is in the high class where the majority of students have been able to develop various abilities among cognitive, affective and psychomotor abilities which are very supportive in their life skills learning process. At Master Elementary School Depok, there are 235 active students, and approximately 20 students at Master Depok Elementary School are still struggling in the street world to just fulfill their daily needs, with the economic demands of the family. Meanwhile, there is very little number of teacher that interest in teaching them. Therefore, the teachers come from volunteers who are willing to spend energy and time to teach. The learning process occurs when the volunteer teacher can spend his time in the midst of other activities.

**Research Method**

This study was used a qualitative or naturalistic method because it is done with natural conditions. Afrizal suggested that qualitative research is a scientific activity using conscious and controlled procedures. Sugiyono suggested that qualitative research methods are methods used to examine natural object conditions, where researchers are key instruments, data analysis is inductive, and the results of qualitative research emphasize the meaning rather than generalization. This research was used data collection techniques, they are observation, structured interviews, and documentation studies. The research is a case study, carried out in Depok, involving teachers who play a role in developing life skills, they are 2 class teachers and 2 life skills teachers. Determination of research subjects was conducted by using purposive sampling technique, the results are specifically street children 9 people, 5 class 4 and 4 class 6 people.

**Research Result**

Depok Master School is one of the schools established to minimize the problem of education in Indonesia, especially for unfortunate children from economic factors, starting from the Early Age Education to the High School level. The Depok Master School is located at Margonda Raya Road, Number 58, Depok Terminal.

The learning conditions are what they are, students are more dominant wearing free clothes such as T-shirts and not wearing shoes but wearing sandals. Observations were carried out in all corners of the school, starting from the school gate which was written by the Foundation, then there was a fairly large school yard for children playing soccer and basketball because of there are basketball goal and basketball hoops and there is also a hall used for students to pray jum’ah together. The elementary school building has two floors with a characteristic. While entering the classroom which is quite unique, students and teachers learn to sit on the school floor and simplicity can be seen in the classroom.
Strategic Role of Teachers in Street Child Life Skill Learning

Based on the results of observations, it appears the urgency of the strategic role of teachers in life skills learning for street children. Life skill learning process means that these skills are needed in career development, innovation skills, also includes skills to do a task, and the skills to create products by using appropriate concepts, principles, materials, and tools. Judging from the conditions of the Depok Master Elementary School, the researchers concluded that it was very different compared to the conditions of other schools, but basically the scientific nature of a child is only children, because the school environment, community environment, and family environment are influential in the formation of children’s character. Therefore, the teacher needs to understand the characteristics of students so that it is easy to carry out educational interactions.

Life skill teachers need to create a pleasant classroom atmosphere. This becomes important for street children because they have a simple understanding, of learning that requires them to think hard becomes unattractive for them. Therefore, teachers are required to create a pleasant classroom atmosphere by providing interesting lessons, not chasing target for the children and not force them to do the will of the teacher, they are given the freedom to choose, the teacher also should provides learning according to their conditions. For example, in life skill learning for the first week they learn to make bracelets from beads, the second week they make headbands with colorful and attractive material colors. In their minds, that’s what is needed to easily bring money.

Street children in Depok Master School are included in the children on the street group stated by Suyanto who have economic activities as child labor on the road, but still have a strong relationship with their parents. Part of their income on the road is given to their parents. Paying attention to the condition of street children as students, the role of the teacher as a planner requires that planning is always reflected in their conditions, learning habits, experience and knowledge, harmonious learning methods, and material that suits their interests. In terms of economics and character of students, it is certainly different from students in general schools. Therefore, the teacher who teaches in the street children class requires high dedication selflessly and needs to have full energy, especially in the process of affective learning. Their people skills are of great use not only in planning and implementation of the projects at the grassroots but also for advocacy and policy-level work.

The learning process was also carried out by volunteers. The school did not demand any provisions about the criteria for volunteers who had to teach at the school due to the lack of human resources especially for teachers. The school only hoped for each teacher to be consistent in teaching and educating students so that the learning process could running smoothly. They consider a challenge to teach and make their students more skilled although there are no wages they receive every month, they are sincere to teach and educate children. So, the learning process requires permanent teachers who have the same commitment and vision so that the learning process is not hampered or disturbed.

Learning Condition of Life Skill for the Street Children

The implementation of life skill learning seems less planned for learning, such as the absence of administration; Learning Plan or learning syllabus. Volunteer teachers who come once a week at Depok primary school make a plan learning is only limited to giving verbal information to homeroom teachers, usually they inform a week before learning. The material given to students is in accordance with their conditions, because the teacher already understands the character and condition of the student. In carrying out the learning process is inseparable from the method used to achieve the learning objectives, but from several data collection techniques the teacher does not understand the techniques and methods, they only apply according to the conditions in the field. The role of the teacher as a diagnosis of student learning progress by way of knowing the development of students gradually through life skill learning by looking at the various results of students’ work from their progress and skills. The benefits of life skill learning are reflected in the activity in learning, the emergence of motivation, good communication, and training their self-confidence. Street children are the causalities of economic woes, war, poverty, loss of traditional values, domestic violence and physical and psychological abuses. They seldom have a choice in becoming a straw in the wind – and going to school is always out of question.
Teachers in making administration as well as reports on student work are limited to physical records of the work, these physical records are not in the form of values but in the form of general descriptions of student development, then the results of notes or information are given to the class teacher who is assigned the value. Tools and materials are prepared directly from the teacher, usually the teacher provides the tools and materials they have for the practice of students who will make skills. They are like scissors and materials from recycled goods. The work of students can be used as a benefit or opportunity to do business by selling and offering their work to guests who come or sell it outside. The experiences gained by students and teachers from life skills learning are so many benefits ranging from communication skills, vocational skills, social skills, and personal skills.

The presence of unsupervised children and adolescents on the streets in developing countries is common and a consequence of unfair politics and poor socio-economic development. The benefits that students get are included in street children who are in grades IV and VI in addition to personal, social, academic, and vocational skills that students can develop the talents they get, sell various kinds of products they make, more importantly they are numbered school because in life skill learning students are more active in using psychomotor so they are happy with the learning and they are more eager to go to school. The work can also be used as a business opportunity. Benefits for students that they can train emotionally, independence, can make work, and no less important is to know their talents. The above conditions indicated that teachers play an active role in preparing life skills learning equipment. Unfortunately, they do not play a role as a planner and leader in the sense of making a final report or teacher administration.

Solution

Barriers of human research are less comparable and the absence of wages received by teachers, requires attention from various parties, including the role of the government in determining policies about teacher placement in social institutions by taking into account the welfare of teachers. All parties involved, both at the central, regional and community levels, synergize with the problems of street children, so that they have the right to study seriously and leave activities on the streets which are dangerous both physically and mentally.

It is good for the government, both the Center, the region or the relevant Institution, to place professional teachers in Educational Institutions that are committed to educating the nation’s shoots, so that the problems of street children can be minimized and even completed with life skill learning strategies.

Conclusion

The life skill learning process which includes personal skills, social skills, academic skills, and vocational skills play an important role in the life process of street children, because of these reasons, the teachers need strategies in teaching them so that they are no longer interested in the streets. In addition, teachers play an active role in knowing their condition, providing tools and materials to be used in skills so that they are more likely to learn and be motivated to create and innovate. The efforts of the teacher for the next time is develop their talents and interests by producing works or products according to their needs, so that students become the center and subject of learning.

Barriers to life skill learning of street children is the academic quality of teachers, who come from housewives and have not fulfilled academic qualifications and certification as in the provisions of the Teacher and Lecturer Law number 14 of 2005. Learning goes as it is according to the students’s needs and desires. Class management, less strict discipline, learning methods, and the absence of teacher administration were indicated that the teacher teaches according to the minimum conditions. Thus, there is a need for efforts from various parties to participate, both the government and the community to continue to provide guidance and training to teachers so that they have pedagogical, personality, professional and social competencies.

Source of Funding: Self

Conflict of Interest: No

Ethical Clearance: Obtained from research committee

1. References
2. Virdhani MH. Number of Unpaid Children, 2013. 29-11.
3. Afrizal. Qualitative Research Methods. Jakarta:


Effectiveness of Shaping Technique for Increasing Self Confidence among Minor Autistic Students Banjarmasin, Indonesia

Ririanti Rachmayanie¹, Nina Permata Sari¹, Zainudin Hassan², Desy Nurmiyanti³,
¹Lecturer, Guidance and Counseling of Departement, Lambung Mangkurat of University, Banjarmasin, Indonesia, ²Associate Professor, School of Education, Universiti Teknologi Malaysia, ³Student of Guidance and Counseling Department, Lambung Mangkurat University, Banjarmasin, Indonesia

Abstract

People with autism seem like living in their world, physically they grow normally like children in their age but they have limitations on social relations. The purpose of this study was to describe the self-confidence of minor autistic students before and after counseling with shaping techniques, as well as to determine the effectiveness of shaping technique to help improving the confidence of minor autistic students at Banjarmasin School. This research was quantitative study using an experimental method with a pre-experimental design, using Single Research Subjects. This research was conducted at Banjarmasin, Indonesia. The sample in this study was a student of X Animation class with minor autistic. The research instrument was the treatment material in the form of “Guidelines for Shaping Technique Research to Improve Self-Confidence”.

Key words: Shaping technique, self-confidence, autism

Introduction

In recent years, the world of education in Indonesia has been enriched with the emergence of inclusive concepts in educational settings in an effort to minimize discrimination in educational practice and through inclusive education. It is expected that not only students with special needs, but also other potential students can be educated together with students in general so that there is no gap between them. Inclusive education school not only have students who are classified as non students with special need, but also have students with physical, emotional and economic limitations. Inclusive school generates education for students who are physically, emotionally and economically limited and therefore it is possible for inclusive schools to have disabled students. People with autism are like living in their world. At first glance children with autistic disorders do not seem to have problems. Physically they grow normally like their age in general. However, if examined more deeply, it will be seen that they experience developmental delays (especially in terms of language) and they exhibit ‘strange’ behavior that is not commonly performed by their age “for example, often wagging hands, moving in circles or often looking at the corner eye “.

In this study researchers intended to help autistic students grow their confidence in communicating with their friends first. Self-confidence is one aspect of personality in the form of a belief in one’s own abilities so that they are not influenced by others and they can act according to their will, happiness, optimism, moderately tolerant, and responsibility.

Research Method

Current study used a single subject design. A single subject experimental design (also called a single case experimental design) is a design that can be used if the sample is one. Single subject design is usually used in the investigation of the behavior of someone who arises as a result of several interventions and treatments. Basically the subject is applied to the state of no treatment and by alternating treatments, and performances or achievements are measured repeatedly during each phase. Non-treatment conditions are given symbol A and the condition with treatment is given the symbol B.
This study used research with a single subject with the subject under study that is mild autistic students with low self-confidence by being given a treatment counseling behavior Shaping technique. In research with a single subject method, the design used is a reversal with A-B-A.

The A-B-A design is a development of the basic A-B design where the baseline phase measurements are repeated twice. The basic procedure is measurement in the baseline phase (A1) then in the intervention condition (B) and measurement again in the baseline phase.

This design can be described as follows:

Baseline (A)   Intervention (B)   Baseline (A)

Session (time)

A-B-A Basic Design Procedure [16]

A 1: At first the target behavior is observed indirectly and without being known the student is measured continuously at least 3 and 5 in the baseline condition to a stable condition.

B: treatment with the administration of shaping techniques.

A 2: researching and observing students who have not conducted research is a repetition of the initial conditions of the subject matter in the form of behavioral re-measurement applied to condition A to monitor and evaluate the extent to which interventions can affect the confidence of mild autistic students.

For taking data of students belong to autistic children, researchers use a type of observation research, and interviews.

Shows steps of the shaping technique

Step 1: Analyzing ABC (Antecedent, behavior, consequence)

Activity: a. what kind of problem autistic students face

b. what kind of technique suitable for autistic students

c. what will happen to autistic students after treatment

Step 2: Deciding target of behavior student will achieve

Activity: Counselor deciding what is the problem autistic students face, what kind of problem need to be addressed and what is the target need to be achieved by counselee to help autistic students

Step 3: Deciding what kind of positive reinforcement use with counselee

Activity: Researcher with counselee decided positive reinforcement use in counseling process, decision about positive reinforcement given should be approved by counselee and researcher

Step 4: Making the stage of behavior from beginning until the end

Activity: researchers together with the counselee make the stages of achievement to be achieved at each stage and what are the consequences if these stages cannot be resolved. In this stage the counselee must be able to greet other students, in the first day at least greet one student, the second day greet two other students, the third day also greet three other students, the fourth day greet four other students and the fifth day the counselee greets five students.

Step 5: Planning is able to be modified during the program of shaping technique

Activity: Modification using the ABA model reversal design. At first the target behavior is measured continuously at baseline (A1) with a certain time period then in the intervention condition (B) after that the measurement in the second baseline condition (A2) is given. At this planning stage counselees are trained on how to greet friends first in a good and right way. For example “good morning, good afternoon, hi, etc. while giving a smile to another friend”.

Step 6: Deciding time for giving reinforcement in every stage of program

Activity: The researcher determines when the time to give positive reinforcement counseling to the counselee and the number of attempts to fail experienced by the counselee. After all stages are passed by the counselee the counselee will get a reward. Although in the counseling process the counselee has experienced a failure, the counselee will still be able to continue to the
next stage because when the counselee has tried, even though the counselee will still feel a change in him even if we do not see the changes, maybe the change will only be felt by him because when he failed he had tried to try indirectly what he was trying to imprint on his memory.

For analysis of data from single case experiments, it usually uses graphic that present results. First, evaluations are made regarding design quality. Second, by assuming a fairly valid design, an assessment of the effectiveness of the treatment is made.

**Research Result and Discussion**

Based on the results shown in the Baseline 1 phase, the counselee has not been able to perform the expected behavior formation because the researcher only made initial observations of the counselee in an effort to increase the self-confidence of minor autistic students, so the percentage score obtained was 0%.

Baseline stage 2 counselees are able to show an increase in self-confidence. The following will be described the phases of giving treatment by implementing the steps of the shaping technique contained in the guideline sheet, namely as follows:

The counselee in the 1st day of the Baseline phase has not shown the expected target behavior, namely increasing self-confidence. In this first session researchers only built rapports, determined time and contracted counseling. Based on the results of the agreement in the counseling process, the expected behavior formation target consists of 5 kinds of behavioral formation targets. At this first meeting the counselee had not been given intervention or treatment.

The counselee in the Baseline phase 1 day to 2 days the counselee was not able to show the expected behavioral target even though the second session had given a shaping technique in the form of an introduction so that the counselee was able to tell the problem in more detail, what the counselee felt and the hope of the counselee in the counseling process.

In this second phase the counselee has not been given an order to greet students who are classified as students without special needs and have not been given examples of how to greet friends or students without special needs. Automatically there is no frequency, duration and intensity seen. At this stage the counselee changes behavior by 20%.

At the intervention stage 1 (B1) the researcher starts giving treatment to the counselee. The intervention stage (B) is the treatment stage, at the stage of intervention the counselee is given an example as initial treatment.

Intervention phase 1 (B1) day 3 of the counselee was able to show the expected level of behavior formation in the form of being able to greet friends who belonged to students without special needs. The reason the counselee was able to greet other students because in this phase intervention or treatment has been given by the researcher in the form of giving reinforcement and also the reward to the counselee, besides of his own desire to have many friends, not only friends from fellow students with special need but also students without special need.

The Intervention Phase (B) on day 4 of the counselee showed an increase in behavior change because he was able to greet one friend who was classified as a student without special needs. The reason the counselee was able to greet friends who belong to student without special needs because in this phase the counselee ventured to approach other students. When the counselee greets other students, he saw the student smiling at him so that made him feel happy and finally the counselee wanted to greet other students so that there would be more friends smiles at him again.

In the intervention phase (B) the 5th day the counselee was able to greet 2 students, meaning that the counselee has been able to increase the courage to greet other students. Where initially only 1 person in a day becomes 2 people in a day. So that in this phase the frequency, duration and intensity can be seen.

In the 6th day of intervention (B), the counselee showed an increase in expected behavioral formation, namely not thinking that other students did not care about it, so that in this phase the counselee was able to show 2 behavioral change targets namely being able to greet friends who were students without special needs and not thinking that other students do not care about it, so in this phase the counselee got the same score with day 5, which is getting a score of 4 with a percentage of 40%.

Stage 7 (B) day 7, counselee was able to show the formation of the same behavior as the previous day. In this phase the counselee also showed an increase in the number of greetings namely the counselee who on the 3rd and 4th day was able to greet 1 student, on the 5th
day he was able to greet 2 students, on the 6th day he was able to greet 3 students and finally on the day 7 this counselee experienced more improvement than in the previous days, the counselee was able to greet 4 students within 1 day.

Table 1: The results of recapitulation after obtaining intervention 1 (B1) can be seen in the following table:

<table>
<thead>
<tr>
<th>Day</th>
<th>Shaping behavior target</th>
<th>Maximal Score</th>
<th>Score Obtained</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
</tbody>
</table>

In the intervention phase (B) it can be concluded that the counselee has been able to increase self-confidence by obtaining a score percentage of 40%, but to test whether the counselee was able to continue to increase self-confidence, the researcher returned to measuring the Baseline 2 (A2) stage.

Stage Baseline 2 (A2) was the stage of measuring the second counselee behavior after being given treatment at the intervention stage (B). In the Baseline 2 stage, observations were carried out again on the 8th day and 9th day.

In the Baseline 2 (A2) phase of the 8th day, the counselee was able to carry out two kinds of expected behavioral targets, namely the formation of behaviors greeting friends who are not students with special needs and do not think that other students do not care. So the score obtained is 4 with a percentage of 40%.

On the 9th day the counselee was still able to greet students without special need and judging from the way of greeting it showed a stable level of previous behavior formation which initially was able to greet 1 student in 1 day to be able to greet 4 people in 1 day and on the 9th day consistently students are able to greet 4 people in 1 day.

The ability to increase confidence in the conditions of Baseline 1 (A1), Intervention 1 (B1), and Baseline 2 (A2), can be seen from the following tables and graphs:

Table 2: The recapitulation of the results of Baseline 1 (A1), Intervention 1 (B1), and Baseline 2 (A2) in the form of a table:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Day</th>
<th>Behavior Shaping Target</th>
<th>Maximum score</th>
<th>Score obtained</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 1 (A1)</td>
<td>1</td>
<td>5</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Intervention 1 (B1)</td>
<td>3</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>Baseline 2 (A2)</td>
<td>8</td>
<td>5</td>
<td>10</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>5</td>
<td>10</td>
<td>6</td>
<td>60</td>
</tr>
</tbody>
</table>
From the results of data analysis in the form of visual data between conditions can be proven Ha accepted hypothesis that was the influence of self-confidence in minor autistic students in Banjarmasin SMKN 2 after being treated with Shaping Technique. Shaping is a therapeutic technique that carried out by learning new behavior gradually. Counselors can divide the behavior they want to achieve in several units, then study it in small units \(^1\). Shaping can be defined as the development of a new operant behavior by strengthening the successive approximation of the behavior, and extending the previous approximation to the behavior until the new final target behavior appears\(^4\).

This study using a single subject (also called a single case experimental design) is a design that can be used if the sample size is only one. Basically the subject is applied to the state of no treatment and by alternating treatments, and performances or achievements are measured repeatedly during each phase. Non-treatment conditions are given symbol A and the condition with treatment is given the symbol B \(^1\).

At the first 1-day baseline the counselee did not bring up the expected behavior because the researcher still approached the counselee in order to build rapport and approached the client (attending behavior) which included components of eye contact, body language, and oral language as the initial steps of individual counseling\(^5\).

On the second day the counselee begins to show behavioral changes, namely the counselee begins to dare to tell the researchers, this was in accordance with the steps to build self-confidence, where a counselee took risks by expressing thoughts, feelings, and reactions to certain situations to other people (counselor). And the counselor must respond with acceptance, support, and cooperation and reciprocate the client’s openness by expressing thoughts, feelings, and reactions to the situation to the counselee \(^7\).

The counselee’s intervention stage was targeting to increase behavior seen from the third day to the seventh day, namely greeting students without special needs, but on the third day the counselee was still given an example.

At the baseline 2 the counselee also targets behavior formation but does not experience improvement, the counselee shows the same behavior formation, seen on the eighth and ninth days. In the A-B-A design after measurement in the intervention condition (B) the measurement in the second baseline condition (A2) is given. The addition of the second baseline condition (A2) is intended as a control for the intervention phase so that it is possible to draw conclusions about the functional relationship between the independent variable and the dependent variable \(^16\).

By giving shaping techniques to minor autistic students to increase their self-confidence, which when referred to with characteristics of high self-confidence that is the belief in self-ability, optimistic, objective, responsible, rational and realistic, autistic children are difficult to form behavior in accordance with the characteristics character of that high confidence. So that for the formation of behavior is only directed to one characteristic of high self-confidence, namely the belief in his abilities, namely by increasing the greeting behavior of without special needs, by being treated through individual counseling using the counseling shaping technique to have confidence in his ability to greet students with or without special needs.

**Ethical Clearance:** Done by research committee

**Funding:** None

**Conflicts of interest:** None

**References**

The Self-Efficacy, Self-Regulation and Academic Motivation among Students

Syaidatul Nadrah Ahmad Tarmizi¹, Roslee Ahmad², Sapora Sipon³, Rezki Perdani Sawai⁴, Muhamad Khairi Mahyuddin⁴, Muhammad Hizral Tazzif ⁴, Aqeel Khan⁵

¹Student, Faculty of Leadership and Management, Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan, ²Senior Lecturer, Faculty of Leadership and Management, Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan, ³Assoc. Professor, Faculty of Leadership and Management, Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan, ⁴Senior Lecturer, Faculty of Leadership and Management, Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan, ⁵Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Abstract

The study aims to identify the self-efficacy, self-regulation and academic motivation among students. Research design for this study is case study which used quantitative method. The study involved 140 respondents randomly selected among students Permata Insan in Islamic Science University of Malaysia from Form 1 until Form 4 respondents involved in this study using stratified sampling method which based on their availability to participate. Instruments used are The Self-Efficacy Questionnaire, The Self-Regulation Questionnaire and Academic Motivation Scale. The design of the study uses a survey method. The data were analyzed using descriptive and inferential statistics, independent sample t test and correlation. Research findings shows there is significant relationship between self-efficacy and academic motivation among students, significant relationship between self-regulation and academic motivation among students and significant difference between self-efficacy, self-regulation and academic motivation based on gender among students. Thus, to improve self-esteem, self-regulation and academic motivation among student, there is need of teachers to make diversify in style of teaching when delivering in classroom to ensure delivering are more effective towards students.

Keywords: Self Efficacy, Self Regulation, Academic Motivation, Students

Introduction

Education has been seen because the main issue that contributes to the success of people in life. When a child goes to school, they are under surveillance from parents and teachers to excel in terms of academic fields. Children will work diligently to achieve outstanding results in the lesson. Self-efficacy is the belief in one’s competence in performing particular tasks ¹⁵. It is also perceived as a realistic way of dealing with complications. It is a skill to effectively handle undesired changes². According to Bandura³ described self-efficacy as the belief in one’s capabilities to organize and execute courses of action required to produce given attainments. Self-regulation refers to certain conscious and unconscious processes. It is the human psycho exercises control over the operation of the state and its internal processes. Self-regulation is the key aspect through which the Self acts on the organism. Other authors consider that self-regulation as an individual energy resource. Based on Rashiqah & Siti Azlia ⁴ according The National Morbidity Health Survey (NHMS) the Ministry of Health, shows 11.2 percent of the teens in the group had the idea of suicide, nine percent planned to commit suicide and 10.1 percent committed suicide.

Corresponding author:
Roslee Ahmad
Senior Lecturer Faculty of Leadership and Management, Universiti Sains Islam Malaysia (USIM), Nilai, Negeri Sembilan.
Email: rosmad@gmail.com
Research Objective

1. To identify the difference between self-efficacy and academic motivation among student.

2. To identify the relationship between self-efficacy and academic motivation among student.

3. To identify the relationship between self-efficacy and academic achievement based on gender among student.

Method

This study used quantitative research design in order to acknowledge the self-efficacy, self-regulation and academic motivation. The target population of this research is students of Permata Insan in Islamic Science University of Malaysia (USIM). Sampling is a process selecting number of individual for a study in such a way that they represent the large group from which they were selected. The sample size involved in this study is 140. In this research, three questionnaires namely self-efficacy, self-regulation and academic motivation questionnaire were applied. The Self-Efficacy Questionnaire was developed in 2015. It has 12 items and 3 subscales which includes academic self-efficacy, social efficacy and emotional self-efficacy. This scale ranges from 1 (Not at all) to 5 (Very well). Alpha Value Self-Efficacy is .720. The Self-Regulation Questionnaire was developed by Cleary. It has 13 items and 3 subscale which includes receiving relevant information, formulating a plan, implementing the plan. Alpha Value of Self- Regulation is .890. While the Academic Motivation Scale (AMS-28) High School Version developed. It contains 11 items assessed on a 5-point scale. Alpha Value of Academic Motivation is .970.

Findings

Table 1: The relationship between self-efficacy (SE) and academic motivation (AM) among students

<table>
<thead>
<tr>
<th>Correlations</th>
<th>SE</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.208*</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.014</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>140</td>
<td>140</td>
</tr>
</tbody>
</table>

Significant on level $p < 0.05$

Based on the table 2, a correlation for the data relevant that self-efficacy and academic motivation were significantly correlated, $(r = .208, p < 0.05)$ If the $p$ value is less than or $p <$ the significant level $(\alpha = 0.05)$, then the result is significant. While if the $p$ value is more than or $p >$ the significant level $(\alpha = 0.05)$, then the result is not significant. There is significant relationship between self-efficacy and academic motivation among student. With this, HO1 is accepted.

Table 2: The relationship between self-regulation and academic motivation among students

<table>
<thead>
<tr>
<th>Correlations</th>
<th>SR</th>
<th>AM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.177*</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.037</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>140</td>
<td>140</td>
</tr>
</tbody>
</table>

Significant on level $p < 0.05$

Based on the table 3, a correlation for the data relevant that self-regulation and academic motivation were significantly correlated, $(r = .177, p < 0.05)$ If the $p$ value is less than or $p <$ the significant level $(\alpha = 0.05)$, then the result is significant. While if the $p$ value is more than or $p >$ the significant level $(\alpha = 0.05)$, then the result is not significant. There is significant the relationship between the self-regulation and academic motivation among student. With this, HO2 is accepted.
Table 3: Independent Sample t test on different of self-efficacy, self-regulation and academic motivation based on gender among students

<table>
<thead>
<tr>
<th>Group Statistics</th>
<th>Gender</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>SE</td>
<td>Male</td>
<td>3.65</td>
<td>.508</td>
<td>.282</td>
<td>138</td>
<td>.946</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.67</td>
<td>.490</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SR</td>
<td>Male</td>
<td>3.31</td>
<td>.390</td>
<td>.208</td>
<td>138</td>
<td>.475</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.41</td>
<td>.428</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>Male</td>
<td>3.50</td>
<td>.290</td>
<td>.106</td>
<td>138</td>
<td>.323</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.53</td>
<td>.341</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant on level $p < 0.05$

Based on table 4.15 an independent sample t- test has been run between level self-efficacy, self-regulation and academic motivation based on gender among students. Result showed the significant between self-efficacy based on gender among students ( $t = .282, p < 0.05$ ). This means that there is significant difference between self-efficacy based on gender among students. Thus, HO3 is accepted. The significant between self-regulation based on gender among students ( $t = .208, p < 0.05$ ). This means that there is significant difference between self-efficacy based on gender among students. Thus, HO4 is accepted. Then, The significant between self- academic motivation based on gender among students ( $t = .106, p < 0.05$ ). This means that there is significant difference between academic motivation based on gender among students. With this HO5 is accepted.

Discussion

Relationship between self-efficacy and academic motivation among students

This result showed there is significant relationship between self-efficacy and academic motivation among student Perma Insan. This research is parallel with the findings Alkharusi, Hussain. Results of multilevel analysis showed that student academic self-efficacy beliefs were significantly and positively influenced by students’ perceptions of the assessment tasks. That means, teacher is the main role to improve the student self-efficacy compared to other factors. This shows, the self-efficacy are very useful to the students for increase their academic motivation.

Research also supported by Verdi & Lisa which done research in non-medical prescription stimulant use in graduate students relationship with academic self-efficacy and psychological variables to examine the relationship between non-medical use of prescription stimulants with academic self-efficacy and psychological factors. The result shows the sample consisted of 807 graduate students from universities located in five geographic regions of the United States. In development of self-esteem, self-efficacy is a crucial aspect to focus on since the development of a high sense of self-efficacy leads to an increase in one’s self-respect and generally their self-esteem is improved. It proves, the individuals with high level of self-efficacy are inclined to perform activities in a successful way.

Result also supported by Cerino (2014) in research relationships between academic motivation, self-Efficacy, and academic procrastination used sample of 101 undergraduate students (36.6% men, 63.4% women; $M = 20.76$, $SD = 2.54$, years of age) at a Northeastern public liberal arts university participated in the present study. This result suggests that, in addition to self-efficacy developed through previous learning experiences, learners need to know, and be able to employ, effort self-regulation in order to control their learning behavior for successful learning. Attention to
the research will help to clarify our understanding of the role that self-efficacy plays in academic motivation. Teachers are understandably concerned about teaching students skills; however, simply possessing skills does not ensure that students will be motivated to apply them. In their instructional planning, teachers need to take into account how given procedures affect students’ sense of efficacy.

Relationship between self-regulation and academic motivation among students

This result showed there is significant relationship between self-regulation and academic motivation among student Permata Insan. This research is parallel and supported by Thinbodeaux et al. in research first-year college students’ time use relations with self-regulation and Grade Point Average (GPA) show that how students manage their time is critical for academic performance and is an important component of self-regulated learning. Findings showed that students planned and spent less time on academics than socializing and work obligations in their first semester. Students generally planned to spend more time on academics in the second semester. That means, the students that got higher CGPA in the first semester must involve their society to the next semester to improve their self-regulation in their studies. The students who join themselves in the social programmed, they will improve their self-regulation. That shows, the student who can manage their self-regulation will perform their academic performance. The higher self-regulation, the high in studies performance in academic performance.

Result also supported by in research the effect of collaborative learning and self-assessment on self-regulation. Collaborative learning teaching method (Jigsaw and teacher assistant) is used for one group and the other group had also the same as well as learners’ self-assessment for eight 90-min-sessions. The study population included 75 persons who are divided into three groups of 25 subjects (two experimental groups and one control group). Using a learning techniques questionnaire and the motivated strategies for learning questionnaire (MSLQ) as well as a self-developed achievement test to measure the geometry in the lower and upper levels of the cognitive domain, it was revealed that “cooperative learning and self-assessment” have a positive effect on promoting learners’ “self-regulation” knowledge for geometry course. Collaborative learning and self-assessment also have a positive impact on academic achievement at low and high levels of learners’ cognitive domain. That means, it can be seen the effect of self-regulation and academic achievement to collaborative learning and self-assessment. So that, the high the self-regulation the high the academic achievement to collaborative learning and self-assessment.

The difference the Self-Efficacy, Self-Regulation and Academic Motivation based on gender among students

An independent sample t-test has been run between level self-efficacy, self-regulation and academic motivation based on gender among students. The result finding there is significant difference the self-efficacy, self-regulation and academic motivation based on gender among student Permata Insan. The result shows that there is the significant between self-efficacy, self-regulation and academic motivation based on gender among students.

This research also revealed a significant difference of both female and male students’ self-efficacy. This research is support to the difference the self-efficacy, self-regulation and academic motivation among student. This research parallel with the findings an independent sample t-test has between level self-efficacy, self-regulation and academic motivation based on gender among students which shows the significant negative between self-efficacy, self-regulation and academic motivation among student. This research is support by in research level of students self-efficacy based on gender used a quantitative research. The findings of the research showed 42.7% of male students’ self-efficacy is at moderate category and 47.2% of female students are at high category. This research also revealed a significant difference of both female and male students’ self-efficacy. The research shows, that female have higher self-efficacy, self-regulation and academic motivation rather than male the research is it is expected that counselors provide guidance and counseling services to improve and develop self-efficacy.

Conclusions

This study show female have higher self-efficacy, self-regulation and academic motivation rather than male. There are several ways to overcome this problems and one of it is teacher must provide guidance and
counseling services to improve and develop self-efficacy, especially towards male students as self-efficacy of male students is lower than female students. In addiction, self-efficacy, self-regulation and academic motivation are very important in students life. The perceived self-efficacy, self-regulation and academic motivation among students in Permata Insan in Islamic Science University of Malaysia was positively correlated with self-efficacy, self-regulation and academic motivation. Therefore, perceived self-efficacy with more social support, less stress, manage self-regulation, better relationship which lead to increase academic motivation in life. Moreover, head administration should encourage students to promote positive relationship to enhance the self-efficacy, self-regulation and academic motivation among students.

**Ethical Clearance:** Done by own Interest and with research committee

**Funding:** None

**Conflicts of Interest:** None

**References**


4. Rashiqah, Siti A. The National Morbidity Health Survey (NHMS) the Ministry of Health Malaysia. 2018.


Relationship between Teaching Experience with Self-Efficacy and Instructional Strategies Applied among Secondary School Teachers

Pei Syan Woo¹, Zakiah Mohamad Ashari²
¹Master Student, ²Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Abstract

Within the education system around the world, teaching experience is proven to be one of the important factors in both the teaching and learning processes, which continue to fascinate researchers and educational deliverer. In order to strengthen STEM initiatives which listed in the Malaysia Blueprint 2013-2025, Malaysia places outstanding significance on STEM education. This quantitative study was carried out to identify the relationships between years of teaching experience with self-efficacy and instructional strategies applied among secondary school teachers in implementing STEM education. This study was conducted in 22 secondary schools located in Kemaman, Terengganu. A simple random survey method was used to complete this investigation which involving a total of 217 teachers. They were tested using the Teaching Efficacy Scale (TES) and Minnesota Elective Practice Instructional Strategies Assessment (MEPISA) instrument. The data were analyzed using Statistical Package for Social Science (SPSS) software version 24.0. Pearson correlation was employed to reveal the relationships between the variables in this study. The findings depicted that there was a low but significant positive correlation found between years of teaching experience and personal teaching self-efficacy. Besides, there was no significant correlation between years of teaching experience and general teaching self-efficacy. Furthermore, there was also no significant correlation between years of teaching experience and instructional strategies applied among secondary school teachers in implementing STEM education. To summarize these relationships, an increase in teaching experience can be an indicator of a heightened level of teachers’ personal teaching self-efficacy in the implementation of STEM education.

Keywords: teaching experience, teachers’ self-efficacy, instructional strategies, STEM

Background of Study

Education is crucial to the path of development in human capital and an innovative based economy¹. Malaysian Blueprint 2013-2025 introduces a new educational innovation with the main purpose of preparing all-rounded youth with the skills needed to compete in the job market and economic development. Educator is vital in shaping successfulness in various educational reforms². Thus, the role of teacher as an implementer of innovation should be taken seriously in promoting STEM education³.

The concept of Science, Technology, Engineering and Mathematics (STEM) is about integration of instruction, assessment, and curriculum to improve science education by prioritization of engineering. STEM also mentioned as the professional practice or advance studies in extensive fields of Science, Technology, Engineering, and Mathematics⁴. Due to its integrative approach, STEM is rapidly becoming a new initiative for educational purposes.

Actual teaching experience is believed to be the most influential activity that shapes an individual’s confidence in his or her abilities⁵. Teachers who had more science or math courses in college⁶ or had experience in
implementing similar instructional strategies are better in promoting the inductive and deductive reasoning across disciplines necessary for STEM. Besides, teachers with prior experiences with engineering scored higher on their knowledge of instructional techniques associated with STEM education. Thus, prior experiences by teachers is a plus factor to STEM success.

In educational context, the concept of teacher self-efficacy is referred as teacher’s beliefs regarding his or her ability to plan, set up and conduct events that are essential to achieve educational targets. General teaching efficacy is defined as the teachers’ belief that regarding students’ ability to learn regardless of external determinants, such as their home environment and socioeconomic conditions. Meanwhile, personal teaching efficacy is defined as the teachers’ belief regarding his or her ability to influence student learning.

Instructional strategies are referred as the methods or approaches applied by the teachers in order to hit the basic targets of instruction. Instructional strategies could affect learners’ outcome and let instructors to enhance the diversity of instructional practices. The successfulness of instruction can be accomplished primarily by avoiding the mystical or randomly occurrence of this process. The instructional process ought to be organized, connected and assessed in a deliberate, arranged and orderly manner.

According to previous researches, majority of the science and mathematics teachers lack experience in teaching engineering and STEM integration. Besides, there is a limited number of studies that investigate the teaching experiences necessary for educators to implement integrated instruction. Teacher’s self-efficacy also plays an important role in assisting teachers to screen their teaching experiences as well as interpret their subsequent instructional practices in implementing STEM education. This phenomenon has urged the necessity in studying teaching experience, self-efficacy and instructional strategies applied among secondary school teachers in implementing STEM education.

**Objectives**

The objectives of this study are:

- To identify the relationship between years of teaching experience and self-efficacy (personal teaching self-efficacy and general teaching self-efficacy) among secondary school teachers in implementing STEM education.
- To identify the relationship between years of teaching experience and instructional strategies applied among secondary school teachers in implementing STEM education.

**Methodology**

This study was conducted in 22 secondary schools located in Kemaman, Terengganu. A simple random survey method was used to complete this investigation which involving a total of 217 teachers. The integration of STEM studies in Malaysia was found to be concentrated in the higher education and less attention was paid the primary and secondary school level. The first section was the demographic background which aimed to determine the years of teaching experience. In the second and third section, teachers were tested using the Teaching Efficacy Scale (TES) and Minnesota Effective Practice Instructional Strategies Assessment (MEPISA) instrument. TES developed by Gibson and Dembo was used to determine teachers’ self-efficacy. TES consisted of 16 items with two uncorrelated subscales. Nine items in the personal teaching efficacy subscale were positive items and several items (2, 3, 4, 8, 11, 16) in the general teaching efficacy subscale were negative items. A 6-point Likert scale was used with options ranging from 1=Strongly Disagree to 6=Strongly Agree. MEPISA established by Ford was used to determine the dominant instructional strategies applied in implementing STEM education. MEPISA consisted of 33 items with no subscales. A 5-point Likert scale was used with options ranging from 1=Never to 5=Always. The data were analyzed using Statistical Package for Social Science (SPSS) software version 24.0. Pearson correlation were employed to reveal the relationships between the teaching experience, self-efficacy and instructional strategies applied among secondary school teachers in implementing STEM education. Table 1 shows the relationship of teaching experience with self-efficacy and instructional strategies based on the correlation coefficient analysis.
Table 1: Correlation Coefficient Interpretation

<table>
<thead>
<tr>
<th>Correlation Coefficient</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.20</td>
<td>Negligible Relationship</td>
</tr>
<tr>
<td>0.20 – 0.40</td>
<td>Low Relationship</td>
</tr>
<tr>
<td>0.41 – 0.70</td>
<td>Moderate Relationship</td>
</tr>
<tr>
<td>0.70 – 0.90</td>
<td>High Relationship</td>
</tr>
<tr>
<td>&gt; 0.90</td>
<td>Very High Relationship</td>
</tr>
</tbody>
</table>

Source: Guildford (1973)

Findings

Table 2 shows the distribution of respondents according to years of teaching experience. 35.5% (77) of the teachers had 16 years and above teaching experience and followed by 32.7% (71) who had 11 to 15 years of teaching experience. However, only 3.2% (7) of the teachers had 1 to 5 years of teaching experience and the rest had 6 to 10 years of teaching experience.

Table 2: Years of Teaching Experience Distribution of Respondents

<table>
<thead>
<tr>
<th>Years of Teaching Experience</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 5 years</td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>62</td>
<td>28.6</td>
</tr>
<tr>
<td>11 to 15 years</td>
<td>71</td>
<td>32.7</td>
</tr>
<tr>
<td>16 years and above</td>
<td>77</td>
<td>35.5</td>
</tr>
<tr>
<td>Total</td>
<td>217</td>
<td>100</td>
</tr>
</tbody>
</table>

Pearson correlation analysis was carried out to determine the relationship between teaching experience with self-efficacy (general teaching self-efficacy and personal teaching self-efficacy) and instructional strategies. The findings show that the correlation coefficient (r) between years of teaching experience with general teaching self-efficacy and personal teaching self-efficacy was 0.092 and 0.250 respectively. While, the correlation coefficient (r) between years of teaching experience and instructional strategies was 0.081. According to the Guildford’s Rule of Thumb, there is a positive and low relationship found between years of teaching experience and personal teaching self-efficacy. The positive relationship indicated that an increase in teaching experience would contribute to an increase in personal teaching self-efficacy of the secondary school teachers in implementing STEM education. The finding was statistically significant as the p-value (p=0.000) obtained was lower than alpha at 0.01 level of significance. Meanwhile, years of teaching experience shows negligible relationship with general teaching self-efficacy and instructional strategies. Both results were statistically insignificant (p=0.178, p=0.236).

Table 3: Relationship between Teaching Experience with Self-Efficacy and Instructional Strategies in Implementing STEM Education

<table>
<thead>
<tr>
<th>Variable</th>
<th>Years of Teaching Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation (r)</td>
</tr>
<tr>
<td>General Teaching Self-Efficacy</td>
<td>0.092</td>
</tr>
<tr>
<td>Personal Teaching Self-Efficacy</td>
<td>0.250**</td>
</tr>
<tr>
<td>Instructional Strategies</td>
<td>0.081</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

Based on the Pearson correlation analysis, result showed that there was a low but significant positive correlation (r=0.250) between years of teaching experience and personal teaching self-efficacy of secondary school teachers in implementing STEM education. This result was in line with the study carried out by Taimalu and Öim, on examining Estonian teachers’ efficacy beliefs and characteristics that have an impact on teacher efficacy. The authors found that the years of teaching experience was positively related to personal teaching self-efficacy. This showed that the experienced teachers’ belief in their ability to bring about change in students’ learning was stronger compared to less experienced teachers. Besides, a research done by Flores et al., on 162 public school teachers documented that there is a significant relationship between the years of teaching experience and personal teaching self-efficacy. Regarding teaching experience and STEM pedagogy,
more experienced teachers (greater than or equal to 15 years) felt more positively about the potential impact of STEM pedagogy than teachers with less experience (one to five years). Therefore, teachers with greater years of teaching experience showed a higher level of personal teaching self-efficacy in implementing STEM education.

Meanwhile, there was a negligible correlation ($r=0.092$) found between the years of teaching experience and general teaching self-efficacy of secondary school teachers in implementing STEM education. The result was contrary with the research conducted by Taimalu and Ötmü, the authors found that years of teaching experience was negatively related to general teaching self-efficacy. Teachers with more teaching experience feel more feebleness to solve the negative impacts of the students’ family background and other factors outside of the teachers’ control than teachers with less teaching experience. Besides, Taimaluet al. found that more experienced teachers agreed less that home environment encompassed a larger influence on students’ learning than less experienced teachers. It might be due to teachers with greater years of teaching experience feel more confident in their ability to overcome the negative impacts of home environment and promote students’ learning even without family support. However, the result was in line with the study conducted by Lee et al. The authors indicated that general teaching self-efficacy was not related to years of teaching experience. In a study of K–5 teachers, Nadelson et al. stated that the second cohort’s efficacy for teaching STEM education were not correlated with years of teaching experience. Therefore, the result in this study demonstrated that teaching experience does not account for advancement in general teaching self-efficacy within STEM teaching.

Next, there was a negligible correlation ($r=0.092$) found between the years of teaching experience and instructional strategies. Regarding teaching experience and STEM instructional strategies, Adams et al. opined that experiences with STEM learning and teaching conducted under integrated, place-based events affect positively on pre-service teachers’ understanding of place-based techniques, their perceived ability, and projected intent to design and implement place-based STEM learning events. Nevertheless, current investigation in this study contradicted their findings. One reason may be the respondents involved in this study were not pre-service teachers. The results of this study also challenged the research carried out by Lochmiller who deemed that teachers’ prior experience influenced the way that they conducted instruction in math and science subjects. The findings concluded that the instruction of high school science and math teachers was restricted by distinct subject subcultures that derived from their prior teaching experience. However, the result in this study was supported by Ogunkola and Archer-Bradshaw, on examining 55 secondary school science teachers in Barbados. The authors claimed that the reported instructional assessment practices of teachers were not affected by their teaching experience. Thus, the result in this study showed that teaching experience did not play a significant role in predicting the teachers’ willingness to use effective instructional strategies in the implementation of STEM education.

**Conclusion**

Teacher is a crucial factor in affecting students’ achievement and performance within the integration of STEM education. The findings of this study revealed that there was a low but significant positive correlation found between years of teaching experience and personal teaching self-efficacy. Besides, there was no significant correlation between years of teaching experience and general teaching self-efficacy. Furthermore, there was also no significant correlation between years of teaching experience and instructional strategies applied among secondary school teachers in implementing STEM education. To summarize these relationships, an increase in teaching experience can be an indicator of a heightened level of teachers’ personal teaching self-efficacy in teaching STEM education. However, the findings indicated that years of teaching experience did not make significant contribution to teachers’ general teaching self-efficacy and their willingness to apply instructional strategies in implementing STEM education. Therefore, more studies on STEM education need to be highlighted in order to strengthen STEM initiatives which listed in the Malaysia Blueprint 2013-2025. It is recommended that other factors contributing to teachers’ self-efficacy and instructional strategies should be investigated so that teachers are able to implement STEM education more efficiently on students.

**Source of Funding**: Self

**Conflict of Interest**: NIL

**Ethical Clearance**: Obtained from Ministry of Higher Education, Malaysia
References


17. Rackley RA. A longitudinal investigation of change in teacher efficacy and perceptions of leadership following participation in a technology integration program: Texas A&M University; 2006.


Students’ Perceived Learning Environment for Self Regulation

Sook Ling Lim¹, Kee Jiar Yeo²
¹Postgraduate Student, ²Professor, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Abstract

The aim of this review was to identify students’ perceptions of self-regulated learning environment. Seven studies (N = 16,493) met inclusion criteria for this review. Five top characteristics of self-regulated learning environment identified in most studies were teachers’ social support, student cohesiveness, equity, task orientation, autonomy support regardless of the variability in terms of participants’ age group, types of learning institution or geographical location. This review provides synthesized information for more effective implementation of self-regulated learning in future.

Keywords: students’ perception, learning environment, self-regulation, student engagement, autonomy support

Introduction

Self-regulated learning (SRL) is a goal-oriented cyclical process which involves three phases. The cycle starts with forethought phase, wherein learners set goals and do planning for a task; It is then followed by performance phase, wherein learners monitor their progress and finally learners reflect on the outcomes. Reflections made will be used to make the necessary adjustments for the next task when cycle repeats. SRL has increasingly become important in education during recent years. One of the reasons is the similarity shared by SRL and the 21st century competencies, which both emphasize on self-directed learning to function effectively in terms of fulfilling goals and social communication.

Apart from that, a number of studies indicated that SRL can benefit children in some ways. For example, SRL may decrease the impulsive behaviours, and SRL was significantly associated with academic achievement. However, SRL is not a common practice in most of the learning institutions owing to limited knowledge among the educators and the restrictive curriculum which hinder the integration of SRL in the existing practice.

The aim of this review was to explore the key features of self-regulated learning environment preferred by students. We also intended to understand how these perceived learning environments may motivate students to become active participants of own learning.

Literature Review

From the perspective of social cognitive theory, SRL was illustrated in a triadic reciprocal causation, where the environmental, behavioural, and personal factors were interdependent and influenced one another. In other words, students’ use of SRL strategies depends not only on the environment factors but also on the perceptions of learners (personal) before deciding their actions (behaviour). According to Bandura, personal factors such as self-efficacy, and social environments exerted a stronger influence over human behaviour as compared to the individuals’ objective properties. For instance, if one perceives the learning environments as conducive, they are more confident and thus more motivated to work towards their goals, which increases the likelihood of success.

Nonetheless, learners and contexts were studied independently in most of the previous research. This approach was primarily based on what researchers or teachers think, with the assumption that students will also interpret in the similar manner, which was inadequate to explore how and why SRL develops and changes over time and across contexts. Similarly, Maehr contended
that self-perception was a critical personal variable in regard to contextual changes. This can be illustrated briefly by considering learners’ perceptions towards self, others, and tasks in the context which eventually affect their subsequent behaviours or actions. Hence, the personal factors contributing to SRL should be investigated specifically in the targeted context for a more insightful and reliable outcome.

**Objective**

The objective of this review was to identify the students’ perceived learning environments for self-regulated learning.

**Methodology**

The PRISMA for Abstracts Checklist was used for reporting this review.

**Participants**

From primary school students to undergraduates were eligible for inclusion.

**Types of Studies**

Only published research articles in English with number of participants ≥ 100 were considered. The participants from various regions of the world such as Asia, Middle-East, Australia and Europe were included to minimise the selection bias and to obtain a better representative of the targeted population.

**Types of Outcome Measures**

Studies were only included if the outcomes were obtained through the standardized questionnaires, which were widely used across multiple disciplines or different cultural contexts.

**Search Strategy**

A total of 1194 studies were obtained from five databases. After the application of conditions and stages of screening, only seven articles were selected for this review. Figure 1 shows the flow of information through the different phases of a systematic review.

---

Figure 1: Flow of Information Through the Different Phases of a Systematic Review
Quality Assessment

Risk of bias was assessed according to the guidelines from the Cochrane Handbook for Systematic Reviews of Interventions. Since there were only seven studies included in this review, there was a high risk of overemphasizing effects. Therefore, each study was assessed based on these domains: a) participants (sample size and the cultural context) b) type of instruments used c) main variables involved in the studies d) data completeness in terms of collection and reporting.

Studies were assessed based on six specific domains, namely sequence generation, allocation concealment, blinding, incomplete outcome data, selective outcome reporting and other issues. Each domain was evaluated of the risk of bias and assigned the judgement accordingly. The types of judgement are ‘Yes’ that indicates low-risk of bias, ‘No’ that indicates high-risk of bias and ‘Unclear’ if there are insufficient data reported in the studies. Two authors evaluated the studies against these criteria independently and inconsistencies aroused during the process were resolved through discussion. Figure 2 shows the summary of risk of bias rating.

Result

Characteristics of Studies

From a total of seven studies, the number of participants in each study ranged from 315 to 8570. Most of the populations were Grade 6-10 students, minority were undergraduates. The selected articles were from a broad range of regions such as Europe, United States, Asia, Australia, and Arabic countries. The instruments used in the included articles were either the original version or adapted from the prior studies. The reliability and validity of each tool were examined through data analysis or pilot study and all the result fell within the acceptable range. The variables in all studies were primarily focused on the students’ perceived learning environment towards self-regulation.

<table>
<thead>
<tr>
<th>Adequate sequence generation (selection bias)</th>
<th>Allocation concealment</th>
<th>Blinding (participants)</th>
<th>Incomplete outcome data addressed</th>
<th>Free of selective reporting</th>
<th>Free of other bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
<td>☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐</td>
</tr>
</tbody>
</table>

Note:
⊕ Low-risk (Yes)
☐ High-risk (No)
? Unclear

Figure 2: Summary of Risk of Bias Rating
**Synthesis of results**

The first author examined the following data from each study: (a) studies, (b) participants details, (c) types of instruments used, (d) variables examined, (e) findings obtained. The second author independently reviewed each included article and the respective information. Any clarification or disagreements were resolved through discussion.

**Discussion**

The main outcomes of the included studies were synthesized and discussed. Teachers’ social support was the learning environment factor reported in most studies \( (n=6/7) \). Supportive teachers concerned about the well-being of their students. They were responsive to students’ needs, always offer constructive praise, help, encouragement to students. Hence, students obeyed teachers’ orders more readily, which indirectly disengaged students from deviant behaviours\(^5\) and subsequently helped them to regulate the negative behaviours.\(^12\) In line with this, social support from teachers was expected to motivate students in mastering a given learning task or to persevere through challenging tasks.\(^12\)

Four studies \( (n=4/7) \) reported that student cohesiveness played a significant role in learning process through higher motivation, confidence, engagements, and use of self-regulation strategies. To create a cohesive learning environment, teachers must consistently provide opportunities for students to work together or to interact. When they worked in groups, they felt a sense of togetherness and positive peer relationships might be formed, which eventually led to higher efficacy and self-regulation among the students.\(^8\) A good illustration of this was students were motivated when they received help or guidance from their peers, which then drove them to engage in meaningful learning tasks such as the use of self-regulation strategies.

The third constructive learning environment factors was equity as reported in three studies \( (n=3/7) \) which was found to be positively associated with student engagement or self-regulation. Equity in the context of classroom referred to the equal learning opportunities, praise, help or encouragement given to each student regardless of their gender, level of progress, behaviours or any differences. Fair treatment from teachers created a healthy learning atmosphere which encouraged students to express themselves and also to participate in school activities more voluntarily.\(^24\) Likewise, students were more motivated and eager to use self-regulation strategies if they perceived themselves to be treated equally by teachers.\(^13\)

Task orientation was another learning environment variables reported by three studies \( (n=3/7) \). It was not only a good predictor of self-efficacy, but also closely related with motivation and self-regulation. A task-oriented learning environment could be illustrated as one which emphasized on the importance and the exercise of goal setting. In other words, students needed to set clear and relevant goal for each task and also to know well of what to accomplish upon task completion. For meaningful goals, teachers had to monitor their students consistently and provided the constructive feedback when necessary to ensure they focused on and completed the assigned task.\(^13\) This was supported by Middleton & Midgley\(^4\) who reiterated on how crucial it was to ensure the students understand what they learnt and also to complete the tasks assigned.\(^9,8\)

Lastly, two studies \( (n=2/7) \) reported that autonomy support was a contributing environmental factor towards self-regulation. Typically, an autonomy supported learning environment was one which provides decision-making opportunities, where the students could participate in the discussion.\(^7\) As a result, the students were more likely to engage in meaningful learning tasks and thus promoted school identification, which was the sense of belonging and valuing of school.\(^14\) Another research suggested that autonomy support could retain learners’ intrinsic and rather self-determined regulation\(^15\) which affects self-regulation as learners.

**Conclusion**

**Research Implications**

This review synthesized the information on the students’ perceived learning environments towards self-regulation. The results are good predictors to understand how learners think and interpret the characteristics of an effective classroom, which works for them. Hence, perceptions of learners can be taken into consideration in the context to ensure a more realistic and practical way of problem-solving. In addition, the awareness of putting emphasis on the right learning environment variables benefits educators in various ways such as regulating negative behaviours, increasing the school participation,
and boosting the motivation and perseverance in learning among the students.

**Limitations and Future Directions**

For this review, a number of important limitations needed to be considered. First, this current review yielded only seven studies. The small number of studies restricted a thorough evaluation from various perspectives, thus the conclusion drawn may not be appropriate for generalization purpose. Another limitation was in terms of methodology, which all included studies used quantitative measures such as questionnaires or subscales. Such tools are usually presented in a structured format with close-ended questions determined by researchers, which limit the outcomes. Therefore, the results may not cover the probable natural occurring.

In future research, much effort is required for a more accurate prediction of the learning environment variables, which promote self-regulation among students. First, the availability of literature review for this issue was limited but more were emerging during the recent years, this indicated that SRL was a recent but potential topic to explore. Hence, experimental or intervention programmes are very much needed to observe and to understand how self-regulation develops dynamically within or across individuals, over a relative longer period or across contexts. Besides, researchers may consider to include qualitative measures such as interview since it is on the basis of human experiences, thus provide researchers a more realistic idea for future implementation.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethical Clearance:** Done by research committee

**References**


13. Alzubaidi E, Aldridge JM, Khine MS. Learning English as a second language at the university level in Jordan: motivation, self-regulation and learning...
Retrieval Based Learning on Student Memory Retention Time: A Meta-Analysis

Noor Azizah Bt Aziz¹, Amirmudin Bin Udin²
¹Postgraduate Student, ²Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Abstract
This article is mainly about Retrieval Based Learning (RBL) in memory retention. This meta-analysis study has 2 objectives: (a) to address the time usage for memory retention, and (b) to measure the biggest quantitative effect size according to memory retention time through retrieval activities. This study was conducted by calculating the percentage of 69 studies, including research into practice, research article, intervention study, and journal papers. The studies were selected according to the following criteria: experimental studies on retrieval based learning, and retrieval practice at different educational levels. The studies, which were included within this scope, were carried out between the year 2000 and 2018. A few inclusive criteria are explained in more detail in this article. To obtain more precise articles in answering the objectives, the researcher has chosen 10 suitable articles with retention time as independent variable and were done experimentally. The effect size value can generally be viewed as positive to improve students’ achievement in RBL activities. As the current research may benefit educators, it is hoped to be useful for future research as well as teaching and learning practices in various fields.

Keywords: Meta-analysis, Retrieval based learning, Retrieval practice

Introduction

Retrieval Based Learning is a strategy to regain subject content. It is a main process in understanding a certain subject and it involves cognitive process¹,². It also emphasize that retrieval based learning is a natural process in learning as information is coded and retrieved before the assessments are done³. The retrieval process mainly involves cognitive process within human beings. Previous research³ also state that cognitive process is often related to the education field as it involves individual thinking process and the ability in understanding and expanding information. The researcher thinks that retrieval based learning focuses on the methods of remembering information by using a certain signal so the result of learning can be utilized well. This involves strategies that use memory and cognitive theories in learning. Learning using the retrieval strategy is considered as gaining information and knowledge as well as learning mastery by regaining knowledge. Previous research⁴ also has shown that retrieval based learning is able to improve understanding of knowledge.

This strategy has been used worldwide since the 1990s, and research continues to be done by John Gloverpada in the 198⁵. The essence to the RBL principle is the continuation from a research by a psychologist named Abbott, who was responsible at introducing RBL for its ability to improve learning process through his “recall in the learning process” experiment⁶. Abbott is a psychologist who emphasizes on the effects of using RBL in learning for centuries. Learning occurs through tests or assignments that can help improve one’s memory actively more than just merely reading. In 2006, a research on RBL gains attention once again when it is almost forgotten due to its effectiveness at improving students’ understanding which has been proven in several researches. According to Karpicke and Grimaldi, RBL is
able to improve students’ achievement if actively used in teaching and learning\(^6\). Nunes and Karpicke state that RBL has contributed towards teaching and learning activities in classrooms\(^1\). This is supported by other previous studies\(^2\)–\(^9\) in which they believe that regaining information is done through long-term memory.

**Research Questions**

This meta-analysis is based on the research questions below:

Research Question 1: What is the commonly used time frame in memory retention when RBL process takes place?

Research Question 2: What is the biggest quantitative effect size according to memory retention time with retrieval activity?

**Methodology**

**Collection of the Data**

This study utilizes quantitative meta-analysis method\(^10\) to determine the related fields in RBL, the materials used for RBL learning procedure, learning activities in RBL, and time utilization in memory retention when RBL process is carried out based on the percentage. This research also aims to determine the effect size based on the differences between RBL learning activities and students’ achievement. Research papers were collected based on the publishing years starting from 2000 until 2018. There were 208 related articles found either through online or offline search based on title, keyword, and abstract as the main reference. Once the articles were filtered using Mendeley software, the number of articles decreased to 197. To ensure the suitability of the found articles, further filtering was done until there were 69 relevant ones left. Of these, only 10 articles were found to be best suited to the researcher’s study.

**Analysis Inclusion and Exclusion Criteria**

The criteria used for inclusion into meta-analysis study are given below in detail:

a) The research must be conducted between 2000 and 2018.

b) It must be an article published or scientific refereed journal which is written in English and available in full text.

c) It must consider ‘retrieval based learning’ or ‘retrieval practice’ as one of the independent variables.

d) The studies must be designed according to true or quasi-experimental design.

e) Mean and standard deviations of the scores of experimental and control groups must be given in the findings.

f) The sample size in the experimental and control groups must be given.

g) Assessment tools used in studies must have adequate levels of validity and reliability.

The criteria used for exclusion into meta-analysis study are given below in detail:

a) Not available in full text.

b) Not related to our research questions.

c) Outside the time span of our search.

d) Duplicated studies.

e) Does not include ‘case retrieval’, ‘information retrieval’ and ‘retrieval system’.

**Validity**

Data validity level obtained from studied resources in the meta-analysis research is related to the ability of the data collecting tool used. This is to ensure the needed area can be measured\(^10\). This shows that the tool used in this research has high reliability.

**Data Analysis**

At first, this research only analyzes articles from 2000 to 2018, where data were analyzed using the line chart to help researcher studies the trend at producing articles for 20 years. Data were analyzed in percentage form to classify articles based on the country. Next, the researcher classifies data provider in terms of percentage to ensure the articles are qualified from trusted resources. The researcher studies the population in terms of percentage to ensure that the population of focus by the researcher is similar to those in prior studies for a more matured analysis. The following analysis is the memory retention time by previous researchers to ensure that the time is suitable with the memory theory. The final
analysis is measuring the biggest quantitative effect size based on memory retention time with retrieval activity by using the online effect size calculator provided by David B. Wilson, Ph.D., George Mason University, through http://www.campbellcollaboration.org/escalc/html/EffectSizeCalculator-SMD30.php

Results of Research

Research Question 1: What is the commonly used time frame in memory retention when RBL process takes place?

This study has referred to 10 articles classified according to the analysis inclusion criteria. Based on Figure 1, studies on RBL are mainly conducted for 1 week as found in 6 articles, 5 minutes in 5 articles, and 2 weeks in 3 articles.

![Figure 1: Summary of Previous Research on RBL based on Memory Retention Time](image)

Research Question 2: What is the biggest quantitative effect size according to memory retention time with retrieval activity?

This research refers to 10 articles classified according to the criteria on Coding of Data and Variable, in which only articles with RBL activity and memory retention time as variables are analyzed. According to Table 1, the measure of effect size starts from very small to huge.

![Table 1: Measure of Effect Size](image)

<table>
<thead>
<tr>
<th>Effect size</th>
<th>d</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very small</td>
<td>0.01</td>
<td>11</td>
</tr>
<tr>
<td>Small</td>
<td>0.20</td>
<td>12</td>
</tr>
<tr>
<td>Medium</td>
<td>0.50</td>
<td>13</td>
</tr>
<tr>
<td>Large</td>
<td>0.80</td>
<td>13</td>
</tr>
<tr>
<td>Very large</td>
<td>1.20</td>
<td>11</td>
</tr>
<tr>
<td>Huge</td>
<td>2.0</td>
<td>11</td>
</tr>
</tbody>
</table>

Discussion

Research Question 1: What is the commonly used time frame in memory retention when RBL process takes place?

Meta-analysis statistic finding shows that out of 69 experimental researchers, only 10 are related to memory retention time. According to the period, 1 week is the most studied followed by 5 minutes and 2 weeks. The researcher thought that the period chosen in previous studies are suitable to test students’ memory retention. If the period is too short or too long, the testing process might not be definite. This could occur due to forgetting little by little based on the theory of memory.

Research Question 2: What is the biggest quantitative effect size according to memory retention time with retrieval activity?

Meta-analysis statistic finding shows that there are 10 articles that count the effect size value of the experiment conducted in previous researches. The researcher thought that retrieval activity and period do not show the exact benchmark of effect size value. This means that the period is not exactly the best to measure memory and retrieval activity in a conducted experiment. Thus, there is a need for further study to identify effective retrieval activities in students’ memory retention.

Conclusion

In conclusion, the research finding has shown that Retrieval Based Learning is closely related to memory retention, and that it helps to improve students’ cognitive skills in learning. The results support several previous researches although there are some which do not agree with each other. Thus, this field should be discovered more so that an RBL model or clear guidelines with better variables can be produced and practiced in teaching and learning. The research implication was also discussed as
a reminder and to create awareness among researchers, educators and students for a better quality learning to improve students' achievement.

**Conflict of Interest:** The authors declare no conflict of interest.

**Source of Funding:** None

**Ethical Clearance:** Done research committee

**References**


A Systematic Review of Play-Based Intervention in Enhancing Social Skills Children with Autism Spectrum Disorder

Joanna Hie Ping Ting¹, Kee Jiar Yeo²

¹Postgraduate Student, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, ²Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia

Abstract

Children with Autism Spectrum Disorder (ASD) display social skills dysfunction, such as lack of social interaction, communication skills, social engagement, emotion recognition and social play. One of the aspects being emphasized in managing behaviour of ASD and other categories of learning problems is teaching social skills and academic skills. While learning through play to strengthen social skills behaviour has gained its place in normal preschools but it has been neglected for children with disabilities in classroom settings. Hence, a pressing need for more studies to look into play-based intervention, particularly within the school setting, so as to enhance social skills functioning amongst children with ASD. In fact, many studies have exemplified the benefits of play for those diagnosed with ASD. As such, this review combs through evidences that employ play as an intervention for children with ASD in enhancing their social skills. The objectives of this review are: (i) to identify empirical studies that employed play-based interventions in enhancing the social skills amidst children with ASD, and (ii) to identify the type of play approach applied in natural setting. In order to gather published articles for the study, online databases, such as ScienceDirect, ERIC, ProQuest, PsycINFO, PubMed, Springer link, JSTOR, and Google Scholar, were used for data search. Thirty papers were collected and the outcomes suggest that numerous studies have explored schools to investigate a wide range of play strategies in both structured and unstructured approaches based on specified target skills. Furthermore, this study lists the strengths and shortcomings of the reviewed studies, along with several implications that highlight the practice of play as an intervention within the school setting.

Keywords: Play-based intervention, Social skills, Autism Spectrum Disorder, Systematic

Introduction

Healthy social skills development enhances a child’s engagement in social interaction¹. Social skills are critical to successful social, emotional, and cognitive development. As such, effective social skills programming should be an integral component of educational. However, amongst children diagnosed with Autism Spectrum Disorder (ASD), social skills disabilities have been time and again proven as a core deficit. The social skills competence displayed by children with ASD has attracted extensive empirical researches. The studies show that children with ASD display impair in social interaction², communication³, poor emotional coordination during social exchanges⁴, as well as impairment in response to reaction given by others. In addition, they exhibit impairment in expressing their emotions and more likely to be less empathetic⁵. Furthermore, social skills deficits impede one’s ability to establish meaningful social relationships, which often leads to withdrawal and a life of social isolation⁶.

Children can learn social skills to communicate and express their feelings to others through play⁷. For instance, play provides a safe distance from their psychological problems and expresses appropriate interactions with others⁸. As such, play therapy functions as a means of communication with a therapist to interact with their environment. Although social skills deficits are
a central feature of ASD, few children receive adequate intervention either at school or home. In fact, play-based intervention is a well-known technique that can be used to help children diagnosed with autism. Play-based intervention is part of the imitative therapy as children appear to be more natural in a play setting.

Emotional competence is crucial in social competence as emotions are contextually embedded in social interactions, and spontaneously regulate these interactions by exchanging emotions in accordance with the requirements of the situation. Emotional competence is related to social competence. Similarly, Begeer, Koot, Rieffe, Meerum, & Stegge asserted that emotional competence is embedded in both social interaction and emotion recognition, and children communicate through emotion. Emotion and communication become more meaningful when a child grows older. Emotion becomes a primary medium for communication that regulates social relationship. Furthermore, emotion is vital in creating good relationships with others, including healthy emotional exchanges. Children can learn social-emotional skills to communicate and express their feelings to others through play. For instance, play provides a safe distance from their psychological problems and expresses appropriate interactions with others. As such, play therapy functions as a means of communication with a therapist to interact with their environment.

Play enables children in several areas, such as social skills, cognitive, social-emotional, and physical skills. Play is the most developmentally appropriate way for children to learn perspective-taking, social-emotional, and social skills, and to enhance the ability in social cognition.

Objective

Given the evidence for co-occurring impairment social skills in children with ASD and the relationship between play and social skills amidst the children with ASD, this systematic review examined the objectives as follows: (i) to identify empirical studies that employed play-based interventions in enhancing the social skills element among children with ASD, and (ii) to identify the type of play approach applied in natural setting.

Methodology

This study gathered several published articles retrieved from a number of online databases, namely ScienceDirect, Taylor & Francis Online, ERIC, PubMed, Springer link, JSTOR, and Google Scholar. During the process of data search, the following keywords were used: ‘play’, ‘play intervention’, ‘play therapy’, ‘Theraplay’, ‘Child Centred Play Therapy’ (CCPT), and ‘Intergred Play Group’ were paired with ‘social skills’, ‘social competence’, ‘social and emotional’, ‘autism’, and ‘Autism Spectrum Disorder’ (ASD). Studies including participants with other disorders or disabilities, and with interventions implemented for other skills were excluded.

Since this study investigated play intervention to enhance the aspect of social skills development among children with ASD, the articles retrieved from the search databases had been examined manually to identify articles that were related and appropriate for the purpose of this study. As a result, 15 articles seemed to meet the following criteria: (1) empirical studies that employed play-based intervention in enhancing social skills children with ASD; and (2) articles published from year 2000 and onwards to review recent studies, to enlighten the increasing interest, and to probe into the cutting-edge knowledge in the autism educational research field. Among the 15 reviewed articles, 8 studies employed quantitative approach, while 3 studies utilised qualitative approach, and the other 4 studies used mixed method approach to explore the research questions.

Discussion

The systematic review that discussed in this session included intervention, outcome on social skills development, research design, setting, target areas, interventionist, duration and effectiveness of the intervention.

Intervention

Based on the articles gathered, two play interventions appeared dominant, namely, CCPT and Floortime, herein 7 studies looked into CCPT, while the rest employed Floortime, Theraplay, and Responsive teaching curricula, ‘Learn to Play’ and other play approaches.

The studies exhibited that CCPT interventions promoted positive social behaviours, besides enhancing self-concept and emotional regulation among children diagnosed with ASD. Apart from CCPT, Floortime also appears to an effective approach applied by preschool
teachers to increase social interaction, engagement, and socio-emotional functioning. Besides intervention at home, the Floortime approach has also been used across several settings, such as therapy centres and at schools. Integrated Play group (IPG) support children with autism by engaging them in play with peers in social setting. IPG model emphasises conducive and environment to foster enjoyable social interaction and play sessions.

Outcome on Social Skills

The primary objective of all the interventions reported in the selected articles mainly supported social skills development as well as constructs of social and emotional skills. All the studies mentioned their main purpose of implementing the approach of play interventions. Therefore, in general, CCPT intervention was emphasised for social skills, socio-emotional functioning and play skills. Based on the review, most studies seemed to report successful achievement of their targets among children with ASD.

Research design

From the review, most of the studies employed the pre-test and post-test experimental design to compare the difference social skills, social-emotional functioning, social interaction, emotion recognition, engagement, maladaptive behaviour and play skills between experimental and control groups. Meanwhile, some studies carried out single case study that looked in-depth regarding the social skills subject that targeted.

Setting

Since younger children spend much of their time in preschool setting and less time at home, it is appropriate to implement the necessary intervention in preschool setting. In fact, a research has proven that intervention implemented in preschool setting generates overall positive development outcomes. In this review, all the interventions were carried out in preschool setting. The school setting provides an effective atmosphere in terms of group or individual setting for their social and emotional development.

Targeted areas

All the gathered studies focused on social skills through play intervention in school setting. The aspect of social skills refers to social competence such as interaction, engagement, emotion recognition, social awareness, and social cognition. Some studies focused on social emotional, which are also related to social skills constructs as well. Social interaction and engagement are associated to the recognition of social awareness. Meanwhile, play skills such as pretend play, symbolic play and social play are part of the social competence in social skills. Apart from this construct, empathy, self-regulation, and emotional regulation were also embedded in several studies as the constructs that were investigated.

Duration

The duration of therapy was measured by using two variables: number of sessions and length of treatment. The length of treatment was coded as the elapsed time from the first day until the last day of the play therapy treatment. This coding scheme was adopted to detect possible interactions that may exist between the number of sessions and the length of treatment. More than half of the studies (n =11) failed to provide detailed description of either the frequency or the duration of the play intervention. The remaining studies reported that the duration of the intervention ranged from eight weeks to ten weeks and it was delivered once or twice a week. The average duration per session was only 30 minutes.

Effectiveness

All the studies highlighted the significance of improving social-emotional functioning through play intervention; either structured or non-structured play. The studies also showed that children displayed positive improvement in social behaviour, social skills, social interaction, and enhanced relationships with teachers and therapists.

The outcomes of the review indicated that play intervention is indeed a beneficial intervention that helps children to achieve optimal growth and development in social skills, as well as social competence. An increasing amount of evidence supports the effectiveness of play intervention upon children’s social-emotional.

Conclusion

Play-based intervention has a significant role in enhancing the social skills among young children with ASD, especially in preschool setting. Play based intervention has become more widely recognized as a clinically-proven treatment for children with ASD. Nevertheless, play intervention seems to have been
missed out in school setting, perhaps due to lack of knowledge and skills in conducting this approach among the special education teachers. For that reason, more studies should look into school settings that involve teachers in the research process. This knowledge can form a basis to generate an inclusive environment, apart from avoiding the application of clinical trials at school. In order to achieve this goal, more teachers should be trained to be reflective so that they can implement successful strategies without implementing clinical interventions at schools.

**Conflict of Interest:** Nil

**Source of Funding:** Self Funding

**Ethical Clearance:** Done research committee

**References**


4. Lynch MD. A mixed method analysis of an early intervention program for students with behavioural and concentration difficulties in two schools in malmö, sweden. PQDT - UK & Ireland, D.S.W. 2015 (January); 1–174.


e- PBL: An Innovation to Promote Active Learning and Decrease Cognitive Overload among Medical Students

Heethal Jaiprakash1*, Anudeep Singh1*, Anupam Biswas2, Jaiprakash Mohanraj2, Sarmishtha Ghosh1*

1International Medical University, School of Medicine, Bukit Jalil Campus, Kuala Lumpur, Malaysia
(*Ex-MAHSA UNIVERSITY, Faculty of Medicine, Bandar Saujana Putra, Malaysia),
2MAHSA UNIVERSITY, Faculty of Medicine, Bandar Saujana Putra, Malaysia,

Abstract

Background: Problem based learning (PBL) encourages students to develop generic skills and enhances active & deep learning. However, many times logistics and availability of trained facilitators decrease the possibility of having an effective PBL. This study was planned with an aim to investigate the possibility of using technology along with human support to achieve the same, thus testing the usefulness of e-PBL as one of the options replacing conventional PBL. Methodology: Sixty-four year 2 MBBS students were selected to undergo e-PBL using Google forms. On day 1 the trigger was sent to the students, day 3 they were told to send the facts and unfamiliar words with their meaning. On day 4 the guiding questions were posted which triggered students to search for more information. The answers for the guiding questions were sent by the students on the 6th day. On day 8, the students were given a mini test. The process was repeated for the other triggers. Modified essay question test was given to students who took e-PBL and conventional PBL. The study aimed at assessing the knowledge gained between both groups of students and the perception of the students who took e-PBL. Results: On comparison among the two groups, the P value was found to be statistically non-significant for both end block and e-PBL MEQs (P value 0.6 and 0.2). The students felt that e-PBL increased their ability to link basic science knowledge with clinical and applied knowledge (3.46±.910) and helped them to have a systemic understanding on the topic (3.49±0.910) and also promoted their motivation for self-study and improved their information management skills. Conclusion: There was no difference in the knowledge gained among both groups of students. This suggests that e PBL can be a good alternative for the conventional PBL.

Keywords: e-PBL, Cognitive load, Active learning, technology enhanced medical education, e-learning, online learning.

Introduction

Problem-based learning (PBL), as the name implies, is learning that is driven by problems. The process involves three phases, namely a problem analysis, a self-directed learning and a reporting phase.1,2) In the process of conventional PBL the construction of knowledge is a result of collaborative learning while working with peers as well as through individual self-directed learning.3) The training of students to become self-directed, lifelong learners is one of the outcomes of a PBL curriculum.4) PBL has many advantages., it helps in acquiring generic competencies, encourages deep learning and prepares students for adult learning. There are also drawbacks with PBL. PBL process may inhibit a good teacher from sharing his enthusiasm and experience on the topic while this may also lead to students failing to develop an organized frame work to acquire their knowledge. The facilitators may not have the skills to facilitate PBL and also lack of resources like space for a large group cohort5).
PBL might seem to be an interesting self-learning strategy and is accepted widely by medical educators, but these learning sessions might impose a high cognitive load on students who lack experience in clinical reasoning. The principle of cognitive load is based on a theory called as cognitive load theory (CLT). Cognitive Load Theory (CLT) is an instructional theory that describes the occurrence of optimal learning when instructional material is designed in a manner that fits the function of human cognition. The main focus of CLT is to envisage the outcome performance of the learner by taking into account the capacity and restrictions of human cognition while designing instructional material. CLT provides guidelines to present information in a way that encourages activities which optimise intellectual performance. CLT assumes a limited working memory connected to an unlimited long-term memory, hence instructions should be designed such that working memory is capable of processing the instructions and the working memory load is not exceeded.

Introduction of e-PBL as a teaching learning activity is one of the strategies to reduce cognitive overload.

Use of technology has been widespread in teaching and assessment. They have also been introduced in PBL. This has led to a technology based PBL, the e-PBL. Use of technology increases the interest of the students and also reduce cognitive load and therefore promote active learning. This makes the learning student centered. With idea of reducing the cognitive over load among the students and promoting active learning this study was initiated.

Objectives: The objectives of the current study were

- To compare the knowledge gained among students taking e-PBL session (Test Group) and conventional PBL session (Control Group).
- To analyse student’s perception on e-PBL.

Methodology

Study design: This was an experimental study conducted on sixty-four year 2 MBBS students which was the test group and 110 students were the control who took up conventional PBL. The 64 students of the test group were divided into six groups to ensure that their learning is team based and collaborative. The students were selected by random sampling and their participation in the study was voluntary. The study was conducted in the gastrointestinal and nutrition block and the case selected for the study was gastroesophageal reflux disease (GERD).

Procedure: Ethical clearance was obtained from MAHSA University ethics committee. Informed consent was obtained from all the students under the study. Students who signed the informed consent and only year 2 medical students were included in the study and those who did not matched the criteria were excluded.

Google form and PowerPoint were used to conduct the e-PBL. A total of four triggers were used for the case. The students were instructed to work as a team for all the tasks assigned. The steps followed were as follows for each trigger separately:

Day 1- Trigger was sent to the students via power point

Day 3- Facts and difficult terms were identified by the students and sent to the facilitators

Day 4- Guided questions related to the trigger were posted which would stimulate the student’s thinking process and facilitate their learning. They were told to find answers for these questions and send to the facilitators.

Day 6- The answers to the guiding questions were sent by each group after discussion among the group members

Day 8- Online mini test related to the trigger was given through google form to all the students which they needed to answer individually and not as a group.

The same process was followed for the other three triggers. At the end of the study a modified essay question (MEQ) test was given to test and the control group. Their performance was compared. The gastrointestinal and nutrition end block exam (EBX) MEQ scores were also compared between the test and control groups.

A validated questionnaire was distributed to the test group to assess the perception of the students regarding the e-PBL. The questionnaire contained 10 questions and the students were asked to give their opinion by means of a five point Likert scale. The respondents indicated their agreement or disagreement as scores 5, 4, 3, 2 and 1 for options strongly agree, agree, neutral, disagree and strongly disagree respectively. In addition to this the
Indian Journal of Public Health Research & Development, April-June 2019, Vol. 10, No. 4

students were given an option for free comments.

Analysis: The data was analysed using descriptive statistics and reported as mean and standard deviation. The mean scores were compared using t-test. SPSS version 25, 2018 was used to analyse the data. P value of <0.5 was considered significant.

**Results**

A total of 64 students participated in the study and 110 students were the control. The mean age of the students was 21.4±2.2 years.

### Table 1: Comparison between e-PBL MEQ and End block MEQ score between test and control groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean ± SD</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>e-PBL MEQ score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control group</td>
<td>110</td>
<td>8.1±2.3</td>
<td>F = 0.230</td>
</tr>
<tr>
<td>Test group</td>
<td>64</td>
<td>8.8±2.1</td>
<td>p-value = 0.632</td>
</tr>
<tr>
<td><strong>EBX MEQ Score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control group</td>
<td>110</td>
<td>8.2±2.4</td>
<td>F = 1.245</td>
</tr>
<tr>
<td>Test group</td>
<td>64</td>
<td>9.0±2.1</td>
<td>p-value = 0.266</td>
</tr>
</tbody>
</table>

As shown in table 1 there was no statistical difference in the e-PBL scores between the test and control groups and the EBX MEQ scores between the test and control groups.

### Table 2: Perception of students regarding e-PBL

<table>
<thead>
<tr>
<th>Questions</th>
<th>Mean score ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-PBL increased my level of knowledge in the particular topic.</td>
<td>3.42±1.002</td>
</tr>
<tr>
<td>Helped me to have a systematic understanding of the topic covered in the e-PBL</td>
<td>3.49±.877</td>
</tr>
<tr>
<td>e-PBL Increased my ability to link basic science knowledge with clinical and applied knowledge</td>
<td>3.46±.910</td>
</tr>
<tr>
<td>I had a better understanding of the topic rather than what I would have in the paper PBL</td>
<td>2.93±1.146</td>
</tr>
<tr>
<td>e-PBL promoted my motivation for self-study</td>
<td>3.22±1.126</td>
</tr>
<tr>
<td>e-PBL improved my skill of managing the gathered information</td>
<td>3.27±1.053</td>
</tr>
<tr>
<td>e-PBL helped me in preparing for my Gastrointestinal and nutrition end block exam</td>
<td>3.24±.986</td>
</tr>
<tr>
<td>The idea of e-PBL is interesting</td>
<td>3.16±1.053</td>
</tr>
<tr>
<td>e-PBL is time consuming and not worth all the effort</td>
<td>2.85±1.034</td>
</tr>
</tbody>
</table>

As shown in table 2 the perception of the students regarding e-PBL was positive. They felt that e-PBL promoted self-study and also helped in increasing their knowledge.

### Discussion

Problem based learning (PBL) was first implemented at McMaster university medical school in the 1960’s where it has revolutionised the field of medical education since then.\(^{11}\) In PBL the learners are empowered to integrate theory and practice, and apply knowledge and skills to develop a viable solution to the problem.\(^{12,13}\) In a study conducted in Malaysia, the preliminary data showed that the PBL session imposed a high intrinsic load and low extraneous load on the students. These results showed that students invested more mental effort processing the intrinsic load than the extraneous load.\(^{14}\) Hence we require a strategy which decreases the cognitive load on the students and hence make learning more effective. Use of technology has become widespread in education more so in medical education. Studies have proved that use of technology increase interest and motivation of students, hence promotes learning.\(^{15,16}\)
In our study we found that there was no difference between e-PBL scores and the end block exam scores between the students taking the e-PBL and those who took the conventional PBL. This shows that there was no difference in the knowledge gained between the groups and e-PBL can be an alternative for the conventional PBL. E-PBL gives the students to learn in the comfort of their home and at their own pace. This reduces their cognitive load and improves long term memory. In the logistics point of view, the resources required for an e-PBL is much lesser than that of a conventional PBL. In a study conducted in turkey they found no major difference in the assessment scores between students who took conventional PBL and e-PBL, which was in concurrence with our study. (17)

The perception of our students regarding e-PBL was positive. The students felt that they could learn at their own pace and comfort of their home. They also felt that the accessibility for resources was better in e-PBL. They felt it was a relaxing way of learning. However, some of the students also felt it was time consuming and it was better to have the facilitators to guide them. The study conducted in turkey on medical students also showed good feedback scores for the perception of e-PBL which was in concurrence with our study. (17) The comments were a mix of positive and negative as in our study. This implies that e-PBL can be a good alternative to conventional PBL as it allows the students to be individualised and at the same time collaborative. Therefore, enhance deep learning and improve long term memory. Information overloads the working memory and hence affects long term memory. Splitting the problems into parts and giving the students space to assimilate at their own pace will help the students improve their long term memory and thus enhance learning and their future academic performance. (18)

Conclusion: There was no difference in the knowledge gained between both the study groups. Most of the students had a positive perception about e-PBL. We need further studies to validate this hypothesis.

Limitation of the study: The sample size was too small to come to a logical conclusion. The study was done on a single cohort of students and in only one block. Further studies with multiple cohorts and more blocks can be conducted to come to a definite conclusion.

Conflict of Interest: NIL

Source of Funding: MAHSA University, Bandar Saujana Putra, Malaysia

Acknowledgement: We would like to thank MAHSA University for funding this project. We would also like to thank all the students who participated in this study.

References

(1) Barrows HS, Barrows. The tutorial process. : Southern Illinois University School of Medicine Springfield, IL; 1988.
(11) Gwee MC. Problem-based learning: a strategic learning system design for the education of healthcare professionals in the 21st century.


Prenatal Testosterone and Sporting Success among Malaysian Rugby Athletes

Zulkhairi Azam¹, Zainal Abidin Zainuddin², Halijah Ibrahim³, Asha Hasnimy Mohd Hashim¹, Mohd. Hafizuddin Baki¹, Mohd. Saizul Hafifi Md. Noor⁵

¹Postgraduate Student, ²Associate Professor, ³Senior Lecturer, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia, ⁴Strength and Conditioning Coach, Malaysia Rugby Sevens National Team, Kedah State Sports Council, Malaysia, ⁵Head Coach, Malaysia Rugby Sevens National Team, Tunku Mahkota Ismail Sports School, Malaysia

Abstract

Most researchers imply that superior performance in sports, masculinity and aggression has been accounted to relate with low 2D:4D. During the past South East Asian (SEA) Games 2017, the Malaysia rugby sevens national team won the gold medal in the final and this has put them as the most dominant rugby team in the region. Thus, the objective of this study was to investigate the 2D:4D status of the team and associate with their recent success and also determine whether right 2D:4D or left 2D:4D has higher prenatal testosterone. The team participations in international tournament achievement records were taken from year 2015 to 2017. The result demonstrated that all subjects (N=12) possessed low 2D:4D (0.93 ± 0.023mm), and this was in alignment with past studies stating low 2D:4D was associated with elite athletes and frequent sporting success in various sports. However, there was no significant difference discovered between right 2D:4D and left 2D:4D, proving that either right 2D:4D nor left 2D:4D of the subjects was more susceptible to prenatal testosterone. It is highly suggested that given with proper periodization and along with other related factors, low 2D:4D athletes can have the potential to perform much better and higher chances of having sporting success.

Keywords: Digit ratio, 2D:4D, Testosterone, Rugby, Sporting success

Introduction

For the past decade, researchers are directing their focus on the human biomarker such as the 2D:4D because of its distinctive capability to offer early forecast or predict the individual’s ability in many aspects. It is evident in many recent studies as lower 2D:4D among men has been reported to correlate with positive impact on their ability to perform not just in football and rugby, but it is also associated with high level of attainment across a number of sports such as sumo and basketball and rowing.

In 2D:4D field of discussion, it is proven by many researchers that athletes with low 2D:4D achieved more success and perform better than high 2D:4D athletes. Regardless of that, not many studies were conducted on finding association of 2D:4D influencing higher chances of achieving sporting success especially in rugby. Moreover, there were also a number of contrasting findings that disagree on the suggestion of 2D:4D to be use as sports talent screening tool as they reported there were weak correlation on 2D:4D on sporting success and performance.

Role of sex hormones in sports

Looking into the possible connection of testosterone towards performance in sports, the role of testosterone in human body must be understand first. Testosterone is known as a male-like hormone, contrast to the oestrogen hormone, which is correlates to femininity.

Corresponding author
Zulkhairi Azam,
Postgraduate Student, School of Education, Universiti Teknologi Malaysia (UTM), Skudai, Johor, Malaysia.
Email: zulkhairiazam@uitm.edu.my

DOI Number: 10.5958/0976-5506.2019.00923.9
Understanding to that, the likelihood of an individual to be more masculine or feminine, it depends on these secretion of testosterone, oestrogen or both received during the foetal period\textsuperscript{10-12}.

Relating to sports performance, studies by \textsuperscript{13–16} implied that efficient cardiovascular system, good visual spatial ability and higher muscle cell tissues are affected by testosterone and prominently found in low 2D:4D subjects. Those findings approved that low 2D:4D does have an important contribution in achieving sporting success and performances resulting to some degree from the activity of pre-birth sex hormones\textsuperscript{17} towards the development of better physique and physiologically. In addition to the nature of the rugby sevens, high-risk/contact-sport players tend to have higher level of testosterone than low-risk/noncontact-sport players\textsuperscript{1,18}.

Focusing on the elite and non-elite athletes, low 2D:4D also has been negatively correlate in various findings. For example, a study in English football league\textsuperscript{1} reported that most first team players had lower 2D:4D compared to the reserve and youth team players. This suggests that 2D:4D can influence the sports or skill ability of athletes thus it is highly possible to use 2D:4D as an indicator separating them from the non-winner or non-elite athlete. Moreover, testosterone is also responsible for regulating human personality trait as it accounts for masculinity and aggressiveness level shown by an individual\textsuperscript{19,20}. High amount of testosterone received is suggested to play big influence in moulding an individual’s characteristic to be more aggressive and masculine than high 2D:4D individuals.

**Objective**

The main purpose of this research was to explore the 2D:4D status and profile of the Malaysia rugby sevens national team players, and which we hypothetically presumed that those national rugby players possessed lower 2D:4D that can be associate with their rugby achievements. Apart from that, this study also intends to analyse the differences between the right hand 2D:4D and left hand 2D:4D in order to find out which hand has lower 2D:4D (higher testosterone content), as some studies suggested that lower 2D:4D was more prominent in the right hand of the male human\textsuperscript{21}.

**Method**

**Participants**

For the past few years, Malaysia rugby sevens national team has been recognized as one of the top teams among the south east Asian countries. Further recognition came after the much-anticipated South East Asian Games (SEA Games) 2017, the team had been crowned as the rugby sevens men champion after beating Singapore in the final cup with score 22-7 thus winning the ultimate gold medal. This success further separates the Malaysia rugby sevens national team on a higher standard apart from their SEA counterparts.

The participants’ selection method used was the purposive sampling, as they were from the Malaysia rugby sevens national team, which made up of 12 players (N=12). According to the head coach of the team, the selection criteria were very tough and structured; therefore, all of the selected players were counted as the best rugby sevens players in the nation. This distinguish them as the nation’s elite rugby players and in accord with reports from\textsuperscript{2,6,7}, stated that elite players possessed superior physique, overall fitness, higher testosterone content and moreover perform better from the non-elite and non-winner players. The time period for including their achievements were set for two years, from year 2015 to year 2017, taking account into consideration that those selected players have been a mainstay in the team for at least 2 years.

**2D:4D Measurement**

In this study, both hands were included for 2D:4D measurement as neither both hands out predict each other\textsuperscript{21}, as both right 2D:4D and left 2D:4D have the capacity to predict athletic ability. Indirect measurement is implemented by using the scanner machine (Canon CanoScan LiDE 120 with 2400x4800dpi high resolution), as it can eliminate the possibilities of high human error\textsuperscript{22}. To start scanning, hands were put firmly on the scanner in a soft manner with palm facing down the scanner.

After the scanning completed, the hand images were opened in an image viewer software program called as MicroDicom Viewer (version 2.7.9). Both fingers length was measured from the fingertip to the base of finger wrinkle proximal. The result from both fingers were calculated for mean (2D:4D). With a view to guarantee the validity and reliability of the data, the measurement
for each finger was done twice by the same researcher. Measurements ranging above 1.00mm were counted as high 2D:4D and measurements ranging below 1.00mm were counted as low 2D:4D.

**Findings**

Referring to Table 1, the average age of the players was 23±1.54 years old. Meanwhile, for right 2D:4D it was identified lower than left 2D:4D with mean score was 0.92±0.027mm, and mean score for left 2D:4D were 0.93±0.026mm. For overall 2D:4D mean of both hands were recorded as 0.93±0.023mm. This showed that all players possessed low 2D:4D.

<table>
<thead>
<tr>
<th>Players</th>
<th>Min</th>
<th>Max</th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20 years old</td>
<td>25 years old</td>
<td>23±1.54 years old</td>
</tr>
<tr>
<td>Right 2D:4D</td>
<td>0.87mm</td>
<td>0.96mm</td>
<td>0.92±0.027mm</td>
</tr>
<tr>
<td>Left 2D:4D</td>
<td>0.88mm</td>
<td>0.97mm</td>
<td>0.93±0.026mm</td>
</tr>
<tr>
<td>2D:4D Status</td>
<td>0.88mm</td>
<td>0.97mm</td>
<td>0.93±0.023mm</td>
</tr>
</tbody>
</table>

Referring to Table 2 below, it described the overall tournaments record achievements for the Malaysia rugby sevens national team over the past two years from year 2015 to 2017. The highest achievement in Asia Rugby Sevens Series 2016 was in Sri Lanka which the team achieved fifth place out of eight competing Asia teams. After the series, the team competed in pre-SEA Sevens and finished in the semi-final for SEA Sevens 2016 and runner up for the SEA Sevens 2017. In the next edition of SEA Games 2017, the team won the gold medal in the final and this suggesting that there was a relationship of sporting success with low 2D:4D.

**Table 2: Tournament Records for The Malaysia Rugby Sevens National Team**

(Year 2015-2017)

<table>
<thead>
<tr>
<th>Tournaments</th>
<th>Year</th>
<th>Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEA Games – Singapore</td>
<td>2015</td>
<td>2nd place (Cup category)</td>
</tr>
<tr>
<td>Asia Rugby Seven Series – Hong Kong</td>
<td>2015</td>
<td>8th place (out of 8 teams)</td>
</tr>
<tr>
<td>Asia Rugby Seven Series – Korea</td>
<td>2015</td>
<td>6th place (out of 8 teams)</td>
</tr>
<tr>
<td>Asia Rugby Seven Series – Sri Lanka</td>
<td>2015</td>
<td>6th place (out of 8 teams)</td>
</tr>
<tr>
<td>Asia Rugby Seven Series – Hong Kong</td>
<td>2016</td>
<td>8th place (out of 8 teams)</td>
</tr>
<tr>
<td>Asia Rugby Seven Series – Korea</td>
<td>2016</td>
<td>6th place (out of 8 teams)</td>
</tr>
<tr>
<td>Asia Rugby Seven Series – Sri Lanka</td>
<td>2016</td>
<td>5th place (out of 8 teams)</td>
</tr>
<tr>
<td>SEA Sevens</td>
<td>2016</td>
<td>Semi-final (Cup category)</td>
</tr>
<tr>
<td>SEA Sevens</td>
<td>2017</td>
<td>2nd place (Cup category)</td>
</tr>
<tr>
<td>Borneo Sevens</td>
<td>2017</td>
<td>Champion (Plate category)</td>
</tr>
<tr>
<td>Cockburn 7s (Australia)</td>
<td>2017</td>
<td>2nd place (Cup category)</td>
</tr>
<tr>
<td>SEA Games – Malaysia</td>
<td>2017</td>
<td>Champion (Cup category)</td>
</tr>
</tbody>
</table>
According to Table 3 below, paired-samples t-test was conducted to compare the right 2D:4D with left 2D:4D in order to determine which hand is more susceptible to prenatal testosterone. There was no significant differences found in the scores for right 2D:4D (M=0.92, SD=0.027) and left 2D:4D (M=0.93, SD=0.026) conditions; t(11)=-1.654, p = .126.

Table 3: Differences on Right and Left 2D:4D

<table>
<thead>
<tr>
<th>Mean±SD</th>
<th>Paired Differences</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std. Error Mean</td>
<td>Lower</td>
<td>Upper</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2D:4D Right</td>
<td>-0.012±.024</td>
<td>0.007</td>
<td>-0.027</td>
<td>.004</td>
<td>-1.654</td>
</tr>
<tr>
<td>2D:4D Left</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.126</td>
</tr>
</tbody>
</table>

As for Figure 1 below, the figure was meant to show the overall 2D:4D status of the participants. The highest 2D:4D were found in Player 1 with score 0.97mm in his left 2D:4D. Meanwhile, the lowest 2D:4D were found in Player 7 with score 0.87mm in his right 2D:4D. Overall result from Figure 1 suggested all participants had low 2D:4D in both hands.

![Figure1: 2D:4D Status of Right (R) and Left (L) 2D:4D](image)

**Discussion**

Deriving from the results, it can be established that all of the participants had low 2D:4D from the mean score of 0.93±0.023mm, which this study can suggest that they had high testosterone level. As for the nature of the rugby game that is characterised with aggression, frequent physical contact, speed, and forceful movements, low 2D:4D is strongly proven to be the contributing factor for the players to be able to perform and excel within those characteristics²²⁻²⁵.

None of the participants have high 2D:4D, and this is in alignment with most studies¹⁻²,²⁶⁻²⁷. Those previous studies agreed that elite world class athletes possessed low 2D:4D compared to non-athletes, non-elite athletes, non-winners and suggesting that athletes with much lower 2D:4D than others performed far better and achieve more sporting success. This is furthermore being proven through their recent success for winning the gold medal in SEA Games 2017. In Asia Rugby Sevens Series, their best ever national record was set by securing fifth place out of eight teams at the Asia Rugby Sevens Series 2016 at Sri Lanka, which it is considered as the most challenging competition due to the higher standard of opponents. In addition to that, none of any South East Asia countries were qualified enough to compete in the Asia Rugby Seven Series and Malaysia was the sole team qualified based on merit.
The result also found out that there was no significance difference between right 2D:4D and left 2D:4D. Therefore, the result specifically suggests that both hands 2D:4D of the participants do not determine which hand are more susceptible to prenatal testosterone. Contrasting to past studies, which suggested that the right 2D:4D was prominently found lower than left 2D:4D in male athletes and contained higher testosterone level compared to the lower 2D:4D are more significant on the left hand among female athletes. However, it should be taken into consideration that this study sample was small with only 12 players participated compared to those past studies. Increasing the participants may give different perspectives.

**Conclusion**

In conclusion, this study managed to find out most significant part of this study is it managed to associate low 2D:4D of the Malaysia rugby sevens national team players with previous findings on having greater performance and sporting success. For this reason, this study suggests that low 2D:4D has enormous potential to be as explore as an indicator to associate with high performances and success in sports, focusing in context of aggressive and competitive contact sports as testosterone surge is much higher when in aggressive mode.

**Conflict of Interest:** NIL

**Source of Funding:** Self

**Ethical Clearance:** The ethical clearance for this study procedures and data collection on human has been approved by the school’s ethical committee; School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Malaysia.

**References**


25. Tomkinson JM, Tomkinson GR. Digit ratio (2D:4D) and muscular strength in adolescent boys. Early Hum Dev. 2017;113(July):7–9.


On Admission Levels of High Sensitive C-Reactive Protein as A Biomarker in Acute Myocardial Infarction: A Case-Control Study

Hayder Abdul-Amir Maki Al-hindi, Mazin Jaafar Mousa, Thekra Abid Jaber Al-kashwan, Ahmed Sudan, Saja Ahmed Abdul-Razzaq

1University of Babylon/Iraq

Abstract

Atherosclerosis is multi-factorial process, which involves the accumulation of lipid, macrophages and intimal plaques in smooth muscle cell of both large and medium sized arteries. Considerable scientific studies have publicized that inflammation plays a major role in the initiation, progression and destabilization of atheroma. C-reactive protein (CRP) is a non-specific acute phase protein produced by liver in response to injury, infection and inflammation (1). C-reactive protein is an inflammatory marker can be considered as global risk assessment for coronary heart disease (2). The objective of study is to determine the CRP level as risk marker in acute myocardial infarction patients.

This was a hospital based cross-sectional study included 68 acute myocardial infarction (AMI) patients aged 30-89 years besides age and sex matched 50 healthy subjects as control group. Blood samples were obtained from both groups and the levels of high sensitive CRP (hs-CRP) have been measured. The current study is an attempt at better understanding the role of hs-CRP in AMI patients.

The mean ± SD of serum hs-CRP levels of patients and control subjects were 8.2 ± 7.1 and 0.6 ± 0.4 mg/dl consequently. It was founded that 64% of patients have higher values of CRP and only 4% have high values of CRP in controls with P-value < 0.05, which was found to be significant. Dyslipidemia, a conventional risk factor of AMI is also associated in this study.

The study showed that high sensitive-C-reactive protein has higher association with acute myocardial infarction.

Keywords: High Sensitive C; Case-Control Study; Reactive Protein; Biomarker.

Introduction

Atherosclerosis involves the accumulation of lipid, macrophages and intimal plaques in smooth muscle cell in both medium and large sized arteries. Recent evidences suggests that that inflammation plays a chief role in the initiation, evolution and destabilization of atheroma (1) and hence the levels of inflammatory biomarkers offer a method of evaluating cardiovascular risk. C-reactive protein (CRP) is a non-specific acute phase protein produced by hepatocytes in response to inflammation and can be considered as universal biomarker for ischemic heart disease (IHD) risk evaluation (2, 3). National guidelines issued by American Heart Association, basically given to measure the CRP in the prevention of IHD (4). The stability of this protein during long-term frozen blood storage and availability of standardized assays have assisted studies of CRP (5). Hepatic synthesis of CRP de novo starts very rapidly after a single stimulus, serum concentrations rising above 5 mg/l by about 6 hours and peaking around 48 hours (6). As a rebuttal to this point, it might be convincingly argued that the value of CRP in AMI is predictive and independent of troponin and the burden of atherosclerosis (7). The current study is an attempt at better understanding the role of hs-CRP in AMI patients and to see whether it can be used as a risk...
marker for AMI.

**MATERIALS AND METHOD**

**Participants:**

This work had been accomplished in Merjan Teaching Medical City, Babylon. It was a case-control study, included 68 AMI patients while the controls were sex & age matched 50 healthy volunteers.

Inclusion criteria: AMI cases age 20- 90 years and both sexes were involved.

Exclusion criteria: acute infection &/or Inflammation, malignancy, renal failure, being on aspirin or NSAIDS.

The patients been evaluated and diagnosed as AMI by physicians and cardiologists depending on history, clinical examination, ECG, echocardiographic finding and cardiac enzymes. Hospital local ethical committee approved the authorization of the current work, and an oral consent of all subjects had been appropriately obtained.

**Laboratory methods:**

Blood samples were obtained from all subjects and the levels of hs-CRP, have been measured, though triglycerides, total cholesterol, HDL, VLDL & LDL levels were reported from patients records that been accomplished in the hospital laboratory. The levels of hs-CRP were estimated by a high sensitivity immunoturbidometric assay using immunology analyzer - Roche Diagnostics Cobas c 111- (USA).

Levels of hs-CRP of subjects classified according to the American Heart Association into (10):

- Low Risk = <1 mg/L
- Moderate Risk = 1 - 3 mg/L
- High Risk = > 3 mg/L

**Statistical analyses:**

Statistical data were obtained using SPSS version 22 software and been expressed in Mean ± SD. Levels of *P*-value < 0.05 considered as significant while levels < 0.001 as highly significant.

**Results**

A closer look at the demographic data shown in table (1) indicates that the mean age (years) of all subjects was 50.5±13.5 with no significant age differences between the groups. Both hypertension, diabetes mellitus besides smoking where significantly higher in patients group. In addition, the table displays overall male predominance 93 Vis 25 female, likewise no significant variation in sex distribution between the two groups. Furthermore, no significant variation concerning body mass index among patients and controls. The data gathered in this study suggests that 88.2% of patients have higher hs-CRP levels (>3.0 mg/dl) while only 4% of the controls were having high hs-CRP values signifying the prominence and impact of inflammation in IHD (Table-2). The specificity and sensitivity of hs-CRP test were considered in order to assess its validity and it were 96% & 88% respectively. The overall accuracy of the test was 91% that render hs-CRP test simply suitable as screening tool for IHD (table-3). The data reported in table (4) reveals significant dyslipidemia in the levels of total lipid profiles among the groups being higher in AMI cases other than the levels of HDL cholesterol.

<table>
<thead>
<tr>
<th>Characters</th>
<th>Total No (%)</th>
<th>AMI Patients (N=68)</th>
<th>Control (N=50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (year)±SD</td>
<td>50.5±13.5</td>
<td>56.5±15</td>
<td>48.5±1</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>Minimum - Maximum</td>
<td>28 - 90</td>
<td>20 – 71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension No (%)</td>
<td>35 (29)</td>
<td>31 (45)</td>
<td>4 (8)</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Diabetes Mellitus No (%)</td>
<td>30 (25)</td>
<td>27 (40)</td>
<td>3 (6)</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Smoking No (%)</td>
<td>79 (67)</td>
<td>32 (47)</td>
<td>10 (20)</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td>Male No (%)</td>
<td>93 (79)</td>
<td>52 (76)</td>
<td>41 (82)</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>Female No (%)</td>
<td>25 (21)</td>
<td>16 (24)</td>
<td>9 (18)</td>
<td>&gt; 0.05</td>
</tr>
<tr>
<td>BMI (Mean)</td>
<td>27.3</td>
<td>27.4</td>
<td>27.0</td>
<td>&gt; 0.05</td>
</tr>
</tbody>
</table>
### Table-2: Comparison of C-reactive protein values between Acute Myocardial Infraction Cases and control subjects

<table>
<thead>
<tr>
<th>(mg/L)</th>
<th>AMI Cases</th>
<th>Healthy Control</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (%)</td>
<td>Mean ± SD</td>
<td>No (%)</td>
</tr>
<tr>
<td>&lt;1 (low risk)</td>
<td>3 (4.4)</td>
<td>8.2 ± 7.1 mg/L</td>
<td>46 (92)</td>
</tr>
<tr>
<td>1-3 (normal)</td>
<td>5 (7.4)</td>
<td>8.2 ± 7.1 mg/L</td>
<td>2 (4)</td>
</tr>
<tr>
<td>&gt;3 (high risk)</td>
<td>60 (88.2)</td>
<td>8.2 ± 7.1 mg/L</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Total</td>
<td>68 (100)</td>
<td>50 (100)</td>
<td></td>
</tr>
</tbody>
</table>

### Table-3: Specificity and Sensitivity of C-reactive protein in the Study

<table>
<thead>
<tr>
<th></th>
<th>Cases</th>
<th>Control</th>
<th>PPV</th>
<th>NPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-reactive protein Positive</td>
<td>TP=60</td>
<td>FP=2</td>
<td>62</td>
<td>48/56=86%</td>
</tr>
<tr>
<td>C-reactive protein Negative</td>
<td>FN=8</td>
<td>TN=48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Sensitivity**: 60/68=88%
- **Specificity**: 48/56=86%
- **Overall Accuracy**: 60+48/118=91%

### Table 4: Lipid Profile for Control and AMI Patients.

<table>
<thead>
<tr>
<th>Levels in (mg/dl)</th>
<th>Group</th>
<th>Mean ± SD</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG</td>
<td>Patient</td>
<td>2.8±0.3</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>1.9±0.6</td>
<td></td>
</tr>
<tr>
<td>TC</td>
<td>Patient</td>
<td>5.6±0.7</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3.9±1.0</td>
<td></td>
</tr>
<tr>
<td>HDL</td>
<td>Patient</td>
<td>3.6±0.7</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>5.6±0.7</td>
<td></td>
</tr>
<tr>
<td>VLDL</td>
<td>Patient</td>
<td>0.5±0.1</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.4±0.1</td>
<td></td>
</tr>
<tr>
<td>LDL</td>
<td>Patient</td>
<td>4.3±0.8</td>
<td>&lt; 0.05</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>0.8±0.7</td>
<td></td>
</tr>
</tbody>
</table>

TG: triglycerides, TC: total cholesterol, HDL: high density lipoprotein, VLDL: very low density lipoprotein, LDL: low density lipoprotein
Discussion

Coronary artery diseases (CHD) represents the main cause of morbidity and/or death in the industrial world (8). Experimental and laboratory researches have revealed that inflammatory process plays a vital role in the atherosclerosis. The presence of CRP is probably point to ongoing inflammation associated with vascular events in addition to a higher possibility of a plaque becoming unstable (9,10). Elevated hs-CRP is a significant prognostic indicator for early risk stratification in patients with an acute coronary syndrome. Increased hs-CRP level, after acute myocardial infarction and during unstable angina correlated to the risk of recurrent attack (11).

This study is an attempt to address the issue of the role of hs-CRP in CHD. There seems to be no compelling reason to argue that CRP has a considerable influence in pathogenesis and progression of all stages of atherosclerosis (8, 12). In the present study, the mean plasma hs-CRP levels in AMI cases was 8.2 ± 7.1 mg/ L which was higher significantly (p < 0.001) than that of healthy group 0.6 ± 0.4 mg/L. This finding is in agreement with the overwhelming evidences corroborating such associations (8, 9, 22). The results of mean serum levels of hs-CRP in the controls are in in accordance with several other researches all over the world (13, 14, 15). In comparison to the study held by Thakur et al (2011), which also exposed association of hs-CRP with CHD significantly. However, the sample size of later study was two hundred; 150 were CHD cases and fifty were controls. Once more, the diagnosis was also accomplished depending on clinical features besides laboratory findings like exercise test, ECG findings, as well as echocardiographic results (16).

In the current study, the specificity and sensitivity of hs-CRP test (96% & 88% respectively) were considered in order to observe the accuracy and validity of test. Meanwhile the overall accuracy of the hs-CRP test was 91%. These results were nearly comparable to that generated by a current study held in Pakistan this year which included 100 CHD patients plus 50 healthy control subjects (8). The later study revealed that the hs-CRP test is 92% specific and 74% sensitive plus an overall accuracy of 80%

On logical grounds, there is no compelling reason to argue that such high sensitivity, specificity and a respectable accuracy rate render the researcher reach to a conclusion that hs-CRP test simply suitable as screening tool for IHD. Additionally, hs-CRP test are obtainable in several standardized research labs. Furthermore, there is overwhelming evidence corroborating the notion that hs-CRP levels correlated with the severity of CAD (14) meanwhile, baseline CRP concentrations are not subject to time-of-day variation, even after years of storage! (14, 17, 18). Based on these evidences, it can be considered as valuable and applicable measure for screening and diagnosing AMI.

Variations in the levels of plasma lipids often detected in IHD patients indeed contribute to the development of atherosclerosis. Our results revealed that the AMI group had higher values of total cholesterol, triglycerides, LDL and VLDL cholesterol nonetheless reduced levels of HDL cholesterol in comparison to the healthy control. Several cohort researches and trials have exposed same conclusions of the association among changes of lipid profile and an increased risk of CHD (19, 20).

Conclusion

In the current study, it could be claimed that hs-CRP represent a substantial biomarker in causation as well as strong association with ischemic heart disease. Hs-CRP biomarker can be considered as a useful measure for diagnose and screen patients with AMI.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


Cholesterol and Triglyceride Indices Are Linked to the Left Ventricle Diastolic Dysfunction: An Echocardiography and Tissue Doppler Study

Suaad Muhssen Ghazi1, Ismail Ibrahim Hussain1, Aalaa Saad Adil1
1College of Medicine/Al-Mustansriyah University, Iraq

Abstract

Echocardiography and tissue Doppler are non-invasive technique that used to detect the subclinical abnormalities of the myocardial function in diabetic patients.

Determination of the lipid indices and the parameters of the left ventricle function by using conventional and tissue Doppler in asymptomatic T2D patients.

This cross-sectional study included 39 healthy subjects (Group I) and 28 patients with type 2 Diabetes (Group II). The measurements of the blood pressure, anthropometric variables and fasting lipid profile were determined. The cardiac function was determined by using conventional and tissue Doppler echocardiography.

Group II expressed significantly high values of anthropometric measurements, and diastolic blood pressure, and a low value of high density lipoprotein. Significantly high values of E/é (medial annulus), E/é (lateral annulus) and É/Á (medial annulus) were observed in Group II compared with Group I. The area of the under the curve of E/A, É/Á (lateral annulus), É/Á (medial annulus) ratios were significantly higher in Group II compared with Group I (0.640 versus 0.385; 0.610 versus 0.259; 0.668 versus 0.396, respectively) when the cholesterol index >1. The area of the under the curve of E/é (lateral annulus) ratio and left ventricular mass were significantly higher in Group II compared with Group I (0.533 versus 0.299; 0.561 versus 0.230, respectively) when the triglyceride index >1.

We conclude that the determinants of the diastolic left ventricle dysfunction which that detected by conventional and/or tissue Doppler in T2D are associated with high cholesterol and triglyceride indices which may serve as discriminator markers.

Keywords: Cholesterol index; Triglyceride index; Echocardiography; Tissue Doppler; type 2 Diabetes

Introduction

Atherosclerosis that resulted from diabetes mellitus is an important cause of cardiovascular events and usually associated with dyslipidemia.1 Echocardiography and tissue Doppler are non-invasive technique that used to detect the subclinical abnormalities of the myocardial function in diabetic patients.2 Echocardiographic phenotype in type-2 diabetes (T2D) showed different patterns that related to the associated risk factors including the gender, obesity and hypertension.3 Preclinical diastolic and systolic dysfunction that detected by conventional and tissue Doppler are observed in T2D, and more commonly found in diabetic patients with other risk factors including hypertension and obesity.4,5 Hypercholesterolemia per se caused diastolic left ventricle dysfunction that did not show improvement with using statins6 whereas the subclinical systolic dysfunction of the left ventricular was observed in hypercholesterolemia and hypertriglyceridemia that associated with T2D7,8 The importance of this study is to clarify the link between the lipids and functional...
changes of the heart in asymptomatic T2D patients. Therefore, the aim of this study is to determine the lipid indices and the parameters of the left ventricle function using conventional and tissue Doppler in asymptomatic T2D patients.

Materials and Method

This study is a cross sectional conducted in the department of physiology, college of medicine at Al-Mustansiriya University in Baghdad-Iraq between October 2016 and June 2017. The patients were recruited from the consultant clinics at the Al-Yarmouk Teaching hospital and refereed to the laboratory and radiological investigations. A consent form was obtained from each patient prior to the admission to the study. The study was conducted according to the ethical guidelines constructed by the Institutional Scientific Committee in which the treatment or using device should not be harmful to the patient and the patient is free to decline from the study or to refuse for study admission. The eligibility of the study was women aged ≥ 35 years. Healthy subjects and T2D were included, and patients were excluded if there is evidence of clinical, laboratory, and radiological findings indicated that the patients had a cardiovascular disease or any complication of diabetes. Type 2 diabetes was defined as either a reported history of this disease or the current prescription of either an oral antidiabetic drug or insulin. Demographic characteristics, blood pressure determination and anthropometric measurements including the calculated body mass index (kg/m$^2$) and waist circumference were recorded. An echocardiogram (conventional and tissue Doppler was performed to all patients. All patients were drawn a fasting venous blood sample at the time of admission into the study for determination of serum glucose and lipid profile including total cholesterol, triglyceride and high density lipoprotein-cholesterol (HDL-c) by enzymatic reaction. Non-high density lipoprotein-cholesterol (Non-HDL-c) was simply calculated by subtraction of HDL-c from the TC. The ratio of TC to the 200 and, the ratio of TG to 160 represented the total cholesterol index (TCI) and triglyceride index (TGI). Lipid index was calculated by subtraction of TGI from TCI and, the positive result indicates excess of cholesterol whereas the negative result indicates excess of TG. The ratio of log TG to HDL-c ≥ 0.5 indicates that patients or subjects are at risk of cardiovascular events.

Statistical analysis

The results were expressed as number, percentage and whenever possible as mean ± SD. The data were analyzed by application of two-tailed, unpaired t test and the difference between percentage test (which indicated when (p) and n(1-p) must both be equal to or greater than 5) and a (p) values of ≤ 0.05 is considered as the lowest limit of significance. The area under the curve of cholesterol and triglyceride indices >1 were calculated for the echocardiography data to discriminate the diabetic patients (Group II) from Group I (healthy subjects. Excel 2007 and SPSS version 20 programs were used in the statistical analysis.

Results

Group II patients showed significant high values of diastolic blood pressure, body mass index, waist circumference and the fasting serum glucose level (Table 1). Fasting serum level of HDL-c was a significantly higher in Group II compared with Group I whereas the other lipid parameters and indices did not significantly differ between Group I and II (Table 2). The mean value of the left ventricle mass index was a significantly higher in Group II patients than corresponding value of the Group I whereas the other echocardiographic parameters of Group II patients did not significantly differ from corresponding values of Group I (Table 3). Group II patients had a significant lower E/A ratio and a significant higher values of E/é (medial annulus), E/é (lateral annulus) and É/Á (medial annulus) compared with corresponding values of Group I (Table 3). Cholesterol index of >1.0 discriminates a significantly area under the curve of E/A ratio, É/Á (lateral annulus), and É/Á (medial annulus) whereas the triglyceride index of >1.0 discriminates a significantly area under the curve of the left ventricle mass index and E/é (lateral annulus) (Table 4).
Table 1: Characteristics of the participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I (n=39)</th>
<th>Group II (n=28)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>47.6±8.0</td>
<td>48.4±8.0</td>
<td>0.688</td>
</tr>
<tr>
<td>Systolic blood pressure (mmHg)</td>
<td>117.7±9.5</td>
<td>121.3±8.0</td>
<td>0.103</td>
</tr>
<tr>
<td>Diastolic blood pressure (mmHg)</td>
<td>74.5±4.4</td>
<td>77.0±5.3</td>
<td>0.049</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>28.7±4.7</td>
<td>32.0±5.6</td>
<td>0.015</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>94.7±11.9</td>
<td>106.8±11.8</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Fasting serum glucose (mg/dl)</td>
<td>88.5±12.4</td>
<td>214.1±112.9</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The results were expressed as mean ± SD. P value represented the significant difference between Group I (healthy subjects) and Group II (type-2 diabetes) using unpaired two tailed student’s (t) test.

Table 2: Fasting serum lipid parameters and indices of the participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I (n=39)</th>
<th>Group II (n=28)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol</td>
<td>193.9±30.0</td>
<td>189.5±43.7</td>
<td>0.656</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>167.9±69.4</td>
<td>168.3±92.7</td>
<td>0.986</td>
</tr>
<tr>
<td>High density lipoprotein-cholesterol</td>
<td>59.2±11.4</td>
<td>45.3±8.9</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Non-high density lipoprotein-cholesterol</td>
<td>134.7±31.4</td>
<td>144.3±43.4</td>
<td>0.324</td>
</tr>
<tr>
<td>Apolipoprotein B-100</td>
<td>93.8±20.4</td>
<td>100.1±28.2</td>
<td>0.324</td>
</tr>
<tr>
<td>Cholesterol index</td>
<td>0.97±0.15</td>
<td>0.95±0.22</td>
<td>0.657</td>
</tr>
<tr>
<td>&gt;1.0</td>
<td>16 (41)</td>
<td>14 (50)</td>
<td>0.466</td>
</tr>
<tr>
<td>Triglyceride index</td>
<td>1.05±0.43</td>
<td>1.05±0.58</td>
<td>0.986</td>
</tr>
<tr>
<td>&gt;1.0</td>
<td>19 (48.7)</td>
<td>10 (35.8)</td>
<td>0.289</td>
</tr>
<tr>
<td>Lipid index</td>
<td>0.08±0.47</td>
<td>-0.10±0.6</td>
<td>0.863</td>
</tr>
<tr>
<td>Positive index</td>
<td>18 (46.2)</td>
<td>15 (53.6)</td>
<td>0.549</td>
</tr>
<tr>
<td>Negative index</td>
<td>21 (53.8)</td>
<td>13 (46.4)</td>
<td>0.549</td>
</tr>
<tr>
<td>Log (Triglyceride to high density lipoprotein-cholesterol ratio)</td>
<td>0.42±0.2</td>
<td>0.52±0.3</td>
<td>0.168</td>
</tr>
</tbody>
</table>

The results were expressed as mean ± SD and number (percentage). P value represented the significant difference between Group I (healthy subjects) and Group II (type-2 diabetes) using unpaired two tailed student’s (t) test and the difference between two independent percentages.

Table 3: Echocardiography and tissue Doppler parameters of the participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I (n=39)</th>
<th>Group II (n=28)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left ventricular end diastolic diameter (mm)</td>
<td>46.6 ± 5.9</td>
<td>45.5 ± 5.2</td>
<td>0.407</td>
</tr>
<tr>
<td>Left ventricular end diastolic volume (ml)</td>
<td>100.0 ± 24.6</td>
<td>98.8 ± 24.8</td>
<td>0.842</td>
</tr>
<tr>
<td>Left ventricular end systolic diameter (mm)</td>
<td>29.7 ± 3.8</td>
<td>28.7 ± 3.54</td>
<td>0.286</td>
</tr>
<tr>
<td>Left ventricular end systolic volume (ml)</td>
<td>35.2 ± 11.1</td>
<td>33.9 ± 10.3</td>
<td>0.607</td>
</tr>
<tr>
<td>Ejection fraction (%)</td>
<td>62.9 ± 6.8</td>
<td>65.8 ± 7.1</td>
<td>0.104</td>
</tr>
<tr>
<td>Shortening fraction</td>
<td>32.8 ± 5.8</td>
<td>34.6 ± 7.4</td>
<td>0.299</td>
</tr>
<tr>
<td>Left ventricle mass (g)</td>
<td>170.3 ± 38.8</td>
<td>160.1 ± 46.7</td>
<td>0.348</td>
</tr>
<tr>
<td>Left ventricle mass index</td>
<td>96.1 ± 24.5</td>
<td>84.0 ± 19.5</td>
<td>0.028</td>
</tr>
</tbody>
</table>
The results were expressed as mean ± SD and number (percentage). *P* value represented the significant difference between Group I (healthy subjects) and Group II (type-2 diabetes) using unpaired two tailed student’s (t) test and the difference between two independent percentages. NC: not calculated because at least one of the samples did not satisfy the requirement of the statistical analysis.

### Table 3: Echocardiography and tissue Doppler parameters of the participants

<table>
<thead>
<tr>
<th>Echocardiography and tissue Doppler parameters</th>
<th>Cholesterol index (&gt;1.0)</th>
<th>Triglyceride index (&gt;1.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group I (n=39)</td>
<td>Group II (n=28)</td>
</tr>
<tr>
<td>Ejection fraction (%)</td>
<td>0.509 (0.305-0.712)</td>
<td>0.464 (0.240-0.689)</td>
</tr>
<tr>
<td>Shortening fraction (%)</td>
<td>0.614 (0.431-0.796)</td>
<td>0.556 (0.335-0.777)</td>
</tr>
<tr>
<td>LV mass index (g/m²)</td>
<td>0.548 (0.398-0.769)</td>
<td>0.541 (0.317-0.756)</td>
</tr>
<tr>
<td>E/A ratio</td>
<td>0.385 (0.171-0.599)</td>
<td>0.640 (0.428-0.853)</td>
</tr>
<tr>
<td>E/é (lateral annulus)</td>
<td>0.550 (0.355-0.744)</td>
<td>0.462 (0.241-0.682)</td>
</tr>
<tr>
<td>E/é (medial annulus)</td>
<td>0.384 (0.203-0.564)</td>
<td>0.480 (0.256-0.703)</td>
</tr>
<tr>
<td>Ê/Â (lateral annulus)</td>
<td>0.259 (0.098-0.419)</td>
<td>0.610 (0.398-0.822)</td>
</tr>
<tr>
<td>Ê/Â (medial annulus)</td>
<td>0.396 (0.201-0.591)</td>
<td>0.668 (0.464-0.873)</td>
</tr>
</tbody>
</table>

**Discussion**

The results of this study showed that diabetic women who were free from clinical evidence of cardiovascular disease had a paradoxical changes of the conventional and tissue Doppler echocardiography when compared with age and gender healthy subjects. Group II patients had a significant evidence of the cardio-metabolic risk factors. This observation is in agreement with other studies that T2D patients have significant increase of the body mass index, waist circumference and high blood pressure. The level of serum high density lipoprotein-cholesterol is reduced significantly in Group II patients compared with Group I subjects. It is well known that T2D patients have hypertriglyceridemia, and low serum level of high density lipoprotein-cholesterol. The level of serum HDL-c in Group II patients is in the range of the lower limit of acceptable range, and this explains that the patients were presented without
clinical evidence of the cardiovascular disease.\textsuperscript{[13]} The data of conventional echocardiography did not discriminate significant difference between Group I and II. This observation does not agree the results of Pareek's study\textsuperscript{[14]} which demonstrated a significant high left ventricle mass index in a large sample size of the participants including both genders. The possibility of the gender-based effect could explain the variability in our study. Moreover, abnormalities of the left ventricle is a manifestation of impaired glucose tolerance even in absence of diabetes.\textsuperscript{[15]} A significant low mean E/A ratio was observed among Group II patients compared to the Group I subjects which indicated that there is evidence of diastolic dysfunction which related to the impairment of ventricular relaxation in the presence of normal ejection fraction percentage.\textsuperscript{[16]} This observation is documented by a significant increase of E/é (medial annulus) ratio which is an estimation of the left ventricle filling.\textsuperscript{[16]} These changes in E/é ratio is attributed to multifactors including the level of glucose, the blood pressure level and the medicines that used.\textsuperscript{[17]} The É/Á ratio that determined by tissue Doppler is significantly decreased as with E/A ratio that determined by conventional echocardiography. Jørgensen et al demonstrated that the serum levels of cholesterol and triglyceride serves as biomarkers of left ventricle function.\textsuperscript{[18]} In this study, the cholesterol and triglyceride indices were applied to discriminate the data of echocardiography that indicated the impact of these lipid on the left ventricle function. Cholesterol index > 1 discriminates the diabetic patients from healthy subjects by the evidence of a high value of the area under the curve of E/A, É/Á (lateral annulus) and, E/é (medial annulus) whereas the triglyceride index > 1 impacts the left ventricle mass index, E/é (lateral annulus) and, E/é (medial annulus). Therefore, levels of cholesterol and triglyceride more than cutoff value of upper normal limit should be consider in the interpretation of echocardiography data that indicated the diastolic dysfunction of left ventricle. Arhlade et al reported that dyslipidemia is an important risk factor of inducing a significant left ventricle dysfunction but the authors did not clarify the effect of each abnormal lipid on the left ventricle dysfunction.\textsuperscript{[19]} Small sample size is one of the study limitations. We conclude that the determinants of the diastolic left ventricle dysfunction which that detected by conventional and/or tissue Doppler in T2D are associated with high cholesterol and triglyceride indices which may serve as discriminator markers.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**REFERENCES**


Microbial Contamination Indoor Environment of Hospitals and Health Centers in Al-Diwaniyah Governorate, Iraq

Saba Abdulameer Kadhem1, Hussein R.Mahmood1, Alaa Mohammad Hasson Al-Husseini1

1College of sciences, university of AL-Qadisiyah, Iraq

Abstract

The current scientific study was carried out to detect the air microbial contamination inside the hospital buildings and health centers in AL-Diwaniyah governorate, where included five hospitals (public and private) are Al-Diwaniyah Teaching Hospital, Al-Diwaniyah Teaching Hospital private, Women & Children Hospital, Shifa Hospital and Al Furat Hospital and five health centers were selected randomly (Center of Blood Diseases, Al - Tali’ah Health Center , Specialized Dental Center , Al Furat Health Center and Algeria Health Center). Many fungal and bacterial species that are considered to be hazardous to public health were isolated and identified. (11) pathogenic fungal species such as Aspergillus fumigatus, Aspergillus sp A.ochraceus, Alternaria alternata, Fusarium solani, Foxyssporum, Mucore sp., Rhizopus stolanifer., Penicillum sp., Penicillum, Cladosporium sp and Candida albicans, whereas bacteria included Staphylococcus aureus, Streptococcus. E.coli did not appear all study areas of AL-Diwaniyah governorate. These results give a clear indication of the level of contamination that could lead to a pandemic.

Keyword: Microbial air pollution, Air fungi, Air bacteria, indoor environment.

Introduction

Air is an important constituent of the atmosphere and is susceptible to contamination with many substances, fumes, fungi, bacteria, pollen and micro-organisms. The air is rarely devoid of fungal spores (1), where several thousand species of fungal and bacterial affect humans, animals and plants were diagnosed in the air (2). The presence of high rates of micro-organisms in the internal environment of hospitals is a worrying and growing factor, and is related to many acute diseases, infections and allergies caused by such microorganisms (3). Internal air quality is very important in controlling microbial contamination in hospitals. Problems associated with indoor air quality in the hospital environment are the most common environmental health issues. Hospitalized symptoms differ from one hospital to another, depending on the nature of hospitals and their health systems (4). The most scientific studies on fungal diseases and bacteria indicate that inhalation of fungus or bacteria can cause allergies, infections and poisoning diseases depending on the type of fungus and the duration of exposure. The fungal spores are considered to be one of the most important pathological factors that can be transmitted through the external and internal air to the hospital environment as well as through the visitors, patients and air conditioners (5). Although the most closed hospitals in terms of ventilation outlets have air conditioning systems based on internal air circulation, they are highly likely to have diseases associated with these buildings. Airborne microbes are a major cause of respiratory infection in humans (6). Fungi are an eukaryotic organism that differs in its nutrition, composition, and behavior from all other living organisms. It is characterized by the difference in nutrition and also has the ability to produce various toxins. Microorganisms, such as fungi, can enter the buildings through outside air, heating, ventilation, air conditioning, doors and windows, as well as with building materials and contaminants (7). Air fungi in buildings have become increasingly important as it has harmful effects on health. According to information obtained from samples of fungi, exposure to fungi causes irritation, sensitivity and toxic effects that can cause many human health problems. Air can assist in

DOI Number: 10.5958/0976-5506.2019.00926.4
medical assessment, determine of treatment methods, and assessment of health risks. It also helps to stimulate follow-up of internal air quality measurement to avoid damage.

**Materials and Method**

**Collection of sample**

The research was carried out during November and December (2017-2018) in hospitals and health centers of AL-Diwaniyah governorate with two repeats of the culture media used to isolate fungus and bacteria.

**Preparation of the cultural media used in the study**

Potato Dextrose Agar (PDA) and Sabrouad Dextrose Agar (SDA) were used to isolate fungi, whereas Eosin-Methylene Blue Agar (EMB) medium and Mannitol Salt Agar medium were used to isolate bacteria. The culture media were prepared based on the information on container.

**Isolation of fungi and bacteria**

The dishes containing (PDA-SDA) media with chloramphenicol(250mg/l) were used to isolate fungi, while EMB agar- and Mannitol Salt Agar were used to isolate bacteria by exposure petri dishes to air in hospitals and health centers for 5 minutes at a height of 1.5 m then incubated at 25°C or 7 days for fungi and 37°C for two days for the bacteria and then fungi were identified based on the outer appearance of the colony, such as color and shape of the colony and also depending on the micro-characteristics according to the approved taxonomic bases. Bacteria were diagnosed using diagnostic culture media.

**Results and Discussion**

About (11) fungal species, yeast *Candida albicans* and two species of bacteria were isolated from air inside the buildings of hospitals and health centers of AL-Diwaniyah governorate.

Five hospitals (public and private) and five health centers were selected randomly. Which could give a clear indication of the level of contamination that could lead to a pandemic. Various of fungal species such as *Aspergillus fumigatus, Aspergillus sp. A.ochraceus, Alternaria alternata, Fusarium solani, F. oxysporum, Mucore sp., Rhizopus stolonifer, Penicillium sp, Cladosporium sp* and *Candida albicans* were isolated and identified. While bacteria included two species *Staphylococcus aureus* and *Streptococcus*. The results revealed that the dominance of fungal species on bacteria in spread and air contamination in all study areas. Fungi are considered to be obligate or facultative saprophytic, their nutritional requirements are simple and produce large numbers of reproductive units, most of which cause health and environmental problems. *Staphalococcus* was recorded in all the hospitals and centers under study except the Euphrates Health Center and the Algiers Health Center. The highest incidence was in the blood transfusion center for thalassemia, whereas *Streptococcus* was recorded in all study areas, where the highest appearance was recorded in the hospital AL-Diwaniyah private and no records for *E.coli* (Table 1).

The results illustrated that the following species *Alternaria alternata, Fusarium solani, Penicillium sp* and *Cladosporium herbarum* were isolated from AL-Diwaniyah Teaching Hospital, while *Aspergillus fumigatus, A.ochraceus, Alternaria alternata, Fusarium solani, Mucore sp* and *Penicillium sp* from the Specialized Dental Care Center. AS for the Blood Transfusion Center for Thalassemia Genetic Diseases, *Penicillium sp, Alternaria alternata, Fusarium solani, F. oxysporum* and yeast *Candida albicans* were isolated. In the same way *Penicillium sp, Mucor sp, Alternaria alternata*, and *Fusarium solani* isolated from Al - Tali’ah Health Center. The results revealed isolating the following species *Mucor sp, Alternaria alternata* and *Fusarium solani* from women’s hospital and children in comparison with The Euphrates Health Center, where *Alternaria alternata, Fusarium solania* and *Aspergillus sp* were isolated. *Alternaria alternata, Fusarium solani*, *F.xoxysporium, Cladosporium sp, Penicillium sp* and *Aspergillus ochraceus* from Algeria Health Center. The results from the air inside the building of Shifa Hospital referred to the Isolation of species (*Alternaria alternata, Cladosporium sp*). The following species *Alternaria alternata, Fusarium solani, F.xoxysporium and Cladosporium sp* were recorded in the Euphrates Hospital. A large proportion of hospital infections acquired as a result of contamination and microbial transmission occur through the hands of health-care workers as a major source of microbial contamination (Figure 1).
**Staphylococcus aureus** and **Streptococcus sp** are considered to be opportunistic pathogens. It is rare to infect healthy humans, but they have high virulence when they infect patients with weak defensive mechanisms causing Bacteremia, eye infections, burns, skin infections, ear infections, bone injuries, wounds, joint, central nervous system infections and heart attack inflammation and their resistance to antibiotics. (8) reported that most isolates of **Staphylococcus aureus** have various resistance methods to various antibiotics such as penicillin, oxacillin, tetracyclines, erythromycin, and clindamycin in a study in the Teaching Hospital of Maternity and Pediatrics in Al-Diwaniyah city. The local invasion by pathogenesis is related to the relationship between patient and microbial contamination and it is one of the important causes of the injuries acquired from hospitals because of their presence in the indoor environment of hospitals, especially when the presence of moisture and spread (9). As well as all isolated fungi are related to allergic diseases such as respiratory allergies due to the inhalation of volatile fungal spores in the air (10, 2). The fungal species Cladosporium spp, Aspergillus spp, Pencillum spp and Alternaria sp are One of the most common allergens in Iraq, Iran, Kuwait, Turkey and Saudi Arabia. (11,12,13). The fungal species Alternaria alternate, Fusarium solani, Penicillium notatum and Candida albicans were isolated by (14) in a study aimed at isolating and diagnosing fungi from the indoor environment of the halls and student clubs of AL- Qadisiyah University. The air of slaughterhouses in AL. Diwaniyah city are contaminated with some microorganisms and included the isolation of several species of bacteria including Staphylococcus aureus and other fungal species such as Aspergillus niger, Aspergillus faveus, Mucor sp and Penicillum notatum (15).

**Table 1:** illustrated the appearance of bacteria isolated from indoor environment of hospital buildings and health centers under study

<table>
<thead>
<tr>
<th>Location</th>
<th>E.coli</th>
<th>Staphylococcus aureus</th>
<th>Streptococcus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diwaniyah Teaching Hospital</td>
<td>-</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Diwaniyah Hospital (Private)</td>
<td>-</td>
<td>3</td>
<td>59</td>
</tr>
<tr>
<td>Women &amp; Children Hospital</td>
<td>-</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Shifa Hospital</td>
<td>-</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Al Furat Hospital</td>
<td>-</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Center of Blood Diseases</td>
<td>-</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Al - Tali’ah Health Center</td>
<td>-</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Specialized Dental Center</td>
<td>-</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>Al Furat Health Center</td>
<td>-</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Algeria Health Center</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
</tbody>
</table>

**Figure 1:** Some of the isolated Fungi on PDA (A), SDA (B).
REFERENCES


Expression of Cyp2c8 Enzyme in Non-Small Cell Lung Cancer with 6A-Hydroxy Paclitaxel Drug by Flow Cytometric Technique

Firas A. Hassan
Department of Chemistry, College of Science, Al-Nahrain University, Baghdad, Iraq

Abstract

Flow cytometry is a way of quantitative elementary cell dissection, a laser or resistance, using in cell sorting, cell counting and biomarker revelation. Cytochrome P450 “CYP” enzymes metabolize carcinogens to inefficient derivatives, however, sometimes the behavior of “CYP” enzymes leads to development of more effective carcinogens. CYP enzymes are also implicated in the activation or inactivation of operators, which are used in the therapy of lung cancer. Paclitaxel drug a high sublime performance in non-small cell lung tumor (H1299) by measured half maximal restrained concentration IC\textsubscript{50} value was 94.48 µg/ml by compared with normal cells IC\textsubscript{50} value was 213.6 µg/ml. Flow cytometric analysis of paclitaxel drug cause cumulation of H1299 cells at G1 phase at 5,10, and 15 µg/ml concentrations. 6α-hydroxy paclitaxel exhibit cell cycle detention across H1299 and maximum concentration at 10 that high influenced on G1 phase accumulation in H1299 cell cycle.

Keywords: Paclitaxel, flow cytometric technique, statistical analyses, cytochrome P450 (CYP2C8).

Introduction

Paclitaxel is a toxic operator that is exceedingly utilized for therapy diverse tumor kinds, like (ovarian, breast and lung tumor). Paclitaxel therapy is often correlating with toxicities like (myelosuppression and neurotoxicity) that display remarkable inter topic variability\cite{[1]}. Intensity of paclitaxel/prompt neurotoxicity is dose-vassal and may be related to its regulation mechanisms \cite{[2]}. Paclitaxel is metabolized by (CYP2C8) to compose 6 α-hydroxy paclitaxel at the (C\textsubscript{6} position) of the “taxane ring” and byCYP3A4 to compose 3-hydroxy paclitaxel at the “phenyl” (C\textsubscript{4} position on) the C\textsubscript{13} side series \cite{[3]}. The cytochrome P450 “CYP” family is a great group of constitutive and inducible haem-including enzymes that stimulate the “mono-oxygenation reaction” utilizing molecular oxygen and equivalent electrons from “NADH via NADH-dependent P450” reductase. CYPs function a central role in the oxidative metabolism of a various extent of xenobiotics \cite{[4]}. Many cytochrome substrates are carcinogenic, whereas other substrates are anticancer drug, subsequently have different potentially remarkable functions in tumor biology \cite{[5]}. Although the liver is the main organ that expresses extreme “CYPs” metabolizing exogenous chemicals, modern development in quantitative and qualitative revelation methods of mRNA and proteins has authorized us to invent that many organs and tissues as well as diverse types of tumor also express distinct CYPs \cite{[6]}.

Materials and Method

In vitro cytotoxic activity of 6 α-hydroxy paclitaxel treatment:

Cytotoxic of non-small cell lung cancer was individual by “MTT” technique, was based on the electric capacity living cells to low the yellow dissolve (tetraezolium corn), to a purple blue unsolvable “formazan” deposit. Residues of viability cell were acquired from 5 independent exam for lung tumor. Cancer cells were plated (1x104cells/well) in 96/ well plates, these were brooded at 37°C, 10%CO2 for 24hours. Next incubation period, agar was extracted and two-folded serial dilution the 6 α-hydroxy paclitaxel
(400, 200, 100, 50, 25, 12.5 µg/ml) were added to the plate. Five times were used for each concentration as well as the normal cells. Agar were accurately extracted and 120µl for DMSO solubility settling was added per each well for 10 minutes, measurement absorb by an “ELISA” reader at a wavelength 570nm.

Human CYP2C8 ELISA kit [7]:

This kit employ Enzyme-linked Immune Sorbent Assay (ELISA) respect on biotin paired antibody sandwich technique to inspection human cytochrome P450 (CYP2C8). CYP2C8 was added to wells that were pre-coated together cytochrome monoclonal antibody and subsequently incubated. After incubation, (anti CYP2C8) an antibody labeled with biotin was added to unite with streptavidin-HRP, whose forms the immune complex. Unrestrained enzymes were isolated next incubation and was irrigation, then substrate A(trypsin buffer) (6mlx1) were added.

Flow cytometric assay procedure [8]:

The cells were clarified by utilizing (density-gradient) centrifugation following the industry directive for use of the separation medium. Cell severance was placed into a labeled (17x100mm/tube). Centrifuge for 5 minute at 300g at room temperature 25C. The supernatant was aspirated, departure approximately 50µl of remaining fluid in the tube to parry disturbing the pellet. One hundred ml of buffer solution was added and disconnect the cells by softly overtaxing at low speed. The concentration was regulated to (1x106 cells/ml) with buffer solution. All the supernatant was flow carefully, then was added 250 µl of solution A (trypsin buffer) and incubated for 10 minute at 25C. Two hundred ml of solution B(trypsin inhibitor and RNase buffer) was added to each tube, then incubated for ten minute at 25C and added 200 µl of cold 8C solution C (PI stain solution). Cell cycle division of nuclear DNA was measurement by flow cytometry (BD Biosciences). The percentage of cells in G1, S, and G2 phases were resolved by Divan software (BD Biosciences).

Statistical analyses:

Two-way “ANOVA” (Duncan) was performed to test whether group variance was considerable (p ≤0.01) or not. It was analyses of differences ” ANOVA” test to compared the parameters group with concentration by post hoc test. Data were expressed as a mean SD deviation and drowned using Graph Pad (Prism version6).

Results and Discussion

Cell viability Measurement:

The cytotoxic influence of the paclitaxel was evaluated towards lung tumor (H1299) by using “MTT” method. The viability rates of H1299-cells treated with 6α-hydroxy paclitaxel were shown in table 1. The results indicated that 24 hrs. after the division of different concentrations of paclitaxel to H1299-cells, viability values were (47.57, 61.23, 80.48, 87.04, 96.95, 97.57%) by compared with normal cells (75.89, 84.22, 92.75, 96.03, 96.88, 93.90%), respectively. The 6α-hydroxy paclitaxel significantly efficiency versus (H1299) of IC50 value (94.48 µg/ml ) than the normal cell with IC50 value (213.6 µg/ml), as shown below in figure 1.

Table 1: Cytotoxic of 6α-hydroxy paclitaxel at different concentrations against non-small lung tumor (H1299) cell line viability

<table>
<thead>
<tr>
<th>Concentrations (µg/ml)</th>
<th>Viability %±SD (H1299) cell line</th>
<th>Viability %±SD (Normal cells)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>47.57±1.738</td>
<td>75.89±1.189</td>
</tr>
<tr>
<td>200</td>
<td>61.23±3.448</td>
<td>84.22±0.342</td>
</tr>
<tr>
<td>100</td>
<td>80.48±1.307</td>
<td>92.75±1.099</td>
</tr>
<tr>
<td>50</td>
<td>87.04±0.703</td>
<td>96.03±0.278</td>
</tr>
<tr>
<td>25</td>
<td>96.95±0.193</td>
<td>96.88±0.176</td>
</tr>
<tr>
<td>12.5</td>
<td>97.57±0.812</td>
<td>93.90±0.991</td>
</tr>
</tbody>
</table>

Figure 1: Effect of 6 α-hydroxy paclitaxel on non-small cell lung tumor (H1299), represent of IC50 for lung tumor cell line and normal cell, respectively.
Level of serum cytochrome P450 (CYP2C8):

The result of (CYP2C8) enzyme grade in serum sample of non-small lung cancer was found a significant increment in the mean level of (CYP2C8) that observed in then 6 α-hydroxy paclitaxel at 44.53 ± 7.26(U/L) by compared to the healthy control at 15.24±5.34(U/L), P<0.001. This enzyme (CYP2C8) was selected because it is accountable for the metabolism of more than 50% of the ready pharmaceutical \[^9\]. Inhibitory influence of a offered drug versus demarcation P450 (CYP2C8) enzyme is often described based on certain probe reactions. Data acquired utilizing this path are precious for the characterization of drug interaction prospect and the design of sufficient clinical realizing, also important to inform whether a kinase inhibitor will intervene with the metabolic salvage of the combining operator like paclitaxel drug \[^10\]. The variation of (CYP2C8) action may be initiative alteration in metabolite ratio, and so on simulating the performance and integrity results of paclitaxel based collection therapies, as paclitaxel-induced neurotoxicity has been related to (CYP2C8) efficiency. CYP enzyme in human lung cancer have been studied obviously less than “CYPs” in pulmonary tissue of animals, fundamentally to obstacles in gaining adequate amounts of human tissue \[^11\].

Paclitaxel effect on cell cycle phase distribution of (H1299) cells:

Cell cycle phase distribution of (H1299) cells experiment was conducted in order to assess whether the inhibition of H1299 cell viability by 6 α-hydroxy paclitaxel was a cell cycle arrest related or not. Flow cytometric technique was used to detect the DNA contents after cell staining with (propidium iodide). The distribution of cell cycle was analyzed after treating the cells with paclitaxel at concentrations (5, 10, and 15 µg/ml). Results data in table 1, figure 2, appeared that at G1 phase, the percentage of cells was significantly increased by increasing the concentration of paclitaxel in a (dose-dependent) manner, starting from slight change at 5 µg/ml (48.2±0.561 µg/ml ) to maximum increase at 10 µg/ml (54.79±0.627 µg/ml) as compared with control. The increase in G1 phase was accompanied with no significant differences in S phase at 5 µg/ml and 10 µg/ml, except at 15µg/ml, an apparent decreased G2/M population was observed in a concentration dependent manner after 24 hrs. in comparison to the control. Induction of cell cycle arrest and apoptosis considered as the most important targets for developing anti-tumor drug, as shown below in figure 3.

![Figure 2: The effect of 6α-hydroxy paclitaxel at. (A) Control. (B) 5 µg/ml. (C) 10 µg/ml, and (D) 15 µg/ml, on H1299 cell cycle phase flow cytometry histogram showing in different cell cycle phase S, G1, and G2/M, using different concentrations of 6α-hydroxy paclitaxel.](image-url)
Conclusions

Paclitaxel drug appeared cell cycle arrest towards non-small lung cancer (H1299) by using flow cytometric technique. It’s showed dose-dependent manner, the maximum concentration at 10 µg/ml that more effected G1 phase accumulation in non-small lung cancer, and showed a significant at (P < 0.01) by compared with S and G2 phases about different concentration that used in flow cytometric assay.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


The Role of Prophylactic “Window” Hydrocelectomy in Prevention of Postvaricocelectomy Hydroceles

Ehab Jasim Mohammad¹, Waleed Nassar Jaffal², Duraid Taha Abdulkareem²
¹College of Medicine, Ibn Sina University of Medical and Pharmaceutical Sciences, Baghdad, Iraq, ²Medical College, AL-Anbar University, Iraq

Abstract

One of the common complications of varicocele surgical treatment is the post-operative hydrocele (PH). A ‘window’ in tunica vaginalis we describe here as a PH prevention procedure modification.

From January 2010 to January 2015, 300 patients, aged 17-39 year old referred to AL-RAMADI TEACHING HOSPITAL in ANBAR, IRAQ, were involved in a case controlled study. They were referred for Varicocelectomy. The patients were into 2 equal groups each of 150 patients. Group A; underwent Sub-inguinal repair without modification, and group B; underwent Subinguinal repair with Window hydrocelectomy. Patients in both groups were evaluated for 12 months.

The age of patients ranged from 17 to 37 years in group A (mean 28±4.3), 18-39 years in group B (mean 27±5.1), there was no significant difference between the two groups. None of the patients in the Subinguinal repair with Window hydrocelectomy group developed post-operative hydroceles, while 24 (16%) of patients in the Subinguinal repair without modification group developed post-operative hydroceles, (P= 0.005) which is statistically highly significant. Non-significant difference was reported with other parameters between group A and B.

Patient follow up, recurrent varicocele was seen in 5 patients in group A and 3 in group B which is statistically non-significant. The seminal fluid parameters improved in 94 patients in group A and in 96 patients in group B with statistically non-significant difference. Wound infection occurred in 3 patients in group A and 4 patients in group B with no significant difference (p value > 0.05).

Window hydrocelectomy is safe and effective in preventing postvaricocelectomy hydrocele formation.

Keywords: varicocele, varicelectomy, hydrocele, complications, outcome

Introduction

Varicocele has been described as a common surgically correctable cause of male subfertility. This is a disease that develops during puberty when both endocrine and exocrine function of the testicle dramatically increases, along with testicular blood flow. Varicocele is rarely detected in boys less than 10 years of age(1)

A varicocele is reported in 15% of males and in about 35% - 40% of men presenting with abnormal semen parameters(2)

Varicocele is rare prior to puberty; presenting in about 10% of adolescents. Bilateral or unilateral (left side affected in 90%) (3)

Varicocele treatment surgery still common for treating male subfertility despite some limitations(4)

Whether treating a varicocele is effective in increasing pregnancy rates in sub fertile couples is controversial, but the current consensus (including a Cochrane review) is that it is not(5,6) although this remains
a highly controversial question(7)

Varicocele are also treated because they may be the cause of chronic scrotal discomfort or for cosmetic reasons.

In adolescents, varicocele are associated with ipsilateral reduction in testicular growth. The discrepancy in testicular size recovers in most boys after treatment of the varicocele(8)

Hydroceles are serous fluid collections in the space between the visceral and parietal layers of the tunica vaginalis. Hydrocele is the most common complication of varicocelectomy, with rates≤20% following the retroperitoneal approach(9)

‘Window’ formation in tunica vaginalis was conducted to allow fluid drainage to scrotum superficial layers and to subinguinal lymphatic nodes(10)

The use of microsurgical lymphatic-sparing techniques has virtually eliminated this complication(9)

Materials and Method

From January 2010 to January 2015, 300 patients, aged 17-39 year old referred to AL-RAMADI TEACHING HOSPITAL in ANBAR, IRAQ, were involved in a case controlled study. They were referred for Varicocelectomy. The study design was approved by the local ethics committee.

The patients were divided according to the simple random sampling method into 2 equal groups each 150 patient. Group A; underwent Subinguinal repair without modification, and group B; underwent Subinguinal repair with window hydrocelectomy. Patients in both groups were evaluated for 12 months.

All patients with pampiniform plexus veins dilation were ultrasound assessed. Surgery indications based on one year or more of infertility with palpable varicocele, pain, stress pattern of semen and testicular atrophy(11,12)

Patients with subclinical varicocele without pain or infertility, bilateral varicocele, recurrent varicocele, patient with previous Subinguinal or scrotal surgery, hydrocele, bleeding tendency, and infection were excluded.

In all cases Subinguinal repair was performed through a small incision just below the external inguinal ring. All veins are ligated. Lymphatic branches are spared to reduce post-operative hydrocele formation(9)

In group A patients, no modification in prevention of postvaricocelectomy hydroceles formation was followed, but in group B patients, a “window” was cut in the tunica vaginalis. Window operations may adequately treat smaller hydroceles. During this procedure a window of tissue from the tunica vaginalis is excised and the edges are oversewn(9)

In order to evaluate surgical results, all patients were followed up for 12 months.

ANOVA test was used to analyze the statistical differences between group means and McNemar’s test for comparison of. Statistical analysis was performed using (SPSS version 24) software. P value of less than 0.05 was considered statistically significant.

Results

The age of patients ranged from 17 to 37 years in group A (mean 28±4.3), 18-39 years in group B (mean 27±5.1), there was no significant difference between them. There was no significant difference in the indications of surgery and the grades of surgery between the two groups (Table 1).

<table>
<thead>
<tr>
<th>Table 1: Characteristics of study groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Characteristic</td>
</tr>
<tr>
<td>Mean age/years ± SD</td>
</tr>
<tr>
<td>Indication of surgery</td>
</tr>
<tr>
<td>Infertility</td>
</tr>
<tr>
<td>Pain</td>
</tr>
<tr>
<td>Testicular atrophy</td>
</tr>
</tbody>
</table>
None of the patients in the Subinguinal repair with Window hydrocelectomy group developed post-operative hydroceles, while 24 (16%) of patients in the subinguinal repair without modification group developed post-operative hydroceles, ($P= 0.015$) which is statistically highly significant (Table 2).

Non-significant difference between group A and B (p value > 0.05) were reported with other parameters (Table 2).

Table 2: Outcome and complications of varicocelectomy.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Group A</th>
<th>Group B</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocele (N/%)</td>
<td>0/0</td>
<td>25/16</td>
<td>0.005</td>
</tr>
<tr>
<td>Recurrence (N/%)</td>
<td>5/3.4</td>
<td>3/2</td>
<td>0.963</td>
</tr>
<tr>
<td>Improvement in seminal fluid parameter (N/%)</td>
<td>94/62.7</td>
<td>96/64</td>
<td>0.863</td>
</tr>
<tr>
<td>Wound infection (N/%)</td>
<td>3/2</td>
<td>4/2.7</td>
<td>0.945</td>
</tr>
</tbody>
</table>

Discussion

Postvaricocelectomy hydroceles formation is common, with an average incidence of about 7% (4,13).

Hydrocele was diagnosed based on scrotum asymmetry. According to the literature, 4-5mm of fluid around the testis anteriorly and laterally, suggests a hydrocele (14,15).

Different modifications have been tried by many authors in order to decrease the incidence of this complication: Atteya et al used lymphatic vessels hydrodissection (16), methylene blue dye used by Alessio et al for identification and preservation of lymphatic vessels during surgery (17). Lymphatic vessels were spared draining the testis in boys operated by standard Palomo method (18), and microsurgical procedure using the operating microscope was used by (19,20), all of the above modifications resulted in significant decrease in hydrocele formation. Also the laparoscopy magnification may have the benefit (21).

Microsurgical varicocelectomy offers the best outcome (20), but the operating microscope is not available to many urologists so we and other authors tried another modification to decrease the incidence of hydrocele formation (22). Combining Jaboulay’s operation with varicocelectomy was suggested for all patients with varicocele to avoid the occurrence of hydrocele and the need for a second surgery (23).

In present study, none of the patients in the Subinguinal repair with Window hydrocelectomy group developed post-operative hydroceles, while 24 (16%) of patients in the Subinguinal repair without modification group developed post-operative hydroceles, ($P= 0.015$) which is statistically highly significant. So our modification is safe and effective in preventing hydrocele formation, and have no adverse effect on seminal fluid parameters improvement after surgery with comparable results to previous studies.

Long period follow up and out-patient control are necessary for higher detection of post-varicocelectomy hydroceles.

The current modification of varicocelectomy allows delivery of the testis with ligation of the gubernacular and external spermatic veins which may lower the incidence of varicocele recurrence, we noted less number of patients with recurrence although it was statistically non-significant.
Conclusions

Window hydrocelectomy is effective in preventing postvaricocelectomy hydrocele formation and it is safe procedure as it does not affect the outcome of surgery regarding improvement in seminal fluid parameters and does not affect the incidence of other complications.

Ethical Clearance

The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


9- Samir S. Taneja. Complications of urologic surgery prevention and management. 4th ed.Ch.54;2010; 632.


Analysis of Serum IL-6 and CRP Levels among Autoimmune and Non-Autoimmune Hypothyroid Patients

Sahar H. A. Al-Hindawi
Department of Basic Science, College of Dentistry, University of Baghdad, Baghdad, Iraq

Abstract
Hashimoto Thyroiditis (HT) is the most common autoimmune thyroid disease and the commonest cause of hypothyroidism. C-reactive protein (CRP) is synthesized in hepatocyte in response to autoimmune disorders; strongly induced by IL-6. This study aimed to estimate serum IL-6 and CRP levels in autoimmune and non-autoimmune hypothyroidism. The present study included 60 Iraqi female hypothyroid patients divided to 30 autoimmune and 30 non-autoimmune, with age ranged between 24-50 years and 30 healthy controls with age ranged between 27-52 years. Serum samples were collected from study groups. The levels of thyroid hormones (TSH, T4 and T3) were determined by using automated Chemiluminescence Immunoassay (CLIA) analysis system. Detection the levels of thyroid peroxidase antibody (TPO-Ab), thyroglobulin antibody (Tg-Ab) and Interluekin-6 by enzyme linked immunosorbent assay (ELISA) kits. While latex agglutination slide test used for determination the presence of serum CRP. The current results revealed that serum TSH, TPO-Ab, Tg-Ab, IL-6 levels and CRP positive ratio are increased significantly (P<0.01) in autoimmune hypothyroid group as compared with non-autoimmune hypothyroid group and control group. But there are no significant differences (p˃0.05) between non-autoimmune hypothyroid patient and control in the level of TSH, T4, T3, TPO-Ab, Tg-Ab, IL-6. Only the positive ratio of CRP is elevated significantly than ratio in control. This study showed significant increase (P<0.01) in IL-6 level and CRP positive ratio in autoimmune hypothyroidism, that indicates to the effect of autoimmune thyroid disease on inflammatory markers IL-6 and CRP in the serum; and increase CRP positive ratio in non-autoimmune hypothyroidism suggested the alteration in the levels of inflammatory marker has been independent from etiology of thyroid disease.

Keyword: autoimmune hypothyroidism, non-autoimmune hypothyroidism, IL-6, CRP

Introduction
Hashimoto’s thyroiditis (HT) is one of autoimmune disorders, caused by environmental and genetic factors that may lead to produce antibodies from immune system that attacked thyroid gland (1), due to loss of tolerance to auto-antigens thyroid peroxidase (TPO) and thyroglobulin (Tg). HT is the most common autoimmune thyroid disease and the commonest cause of hypothyroidism (1,2). Hypothyroidism is caused by inadequate supply of or response to, thyroid hormones throughout the body (3).

C-reactive protein- (CRP) is a protein synthesized in the liver and the major protein of plasma (4). The magnitude of inflammation is directly related to the concentration of CRP which is not affected by other serum components; nevertheless, CRP production is under the control of IL-1, IL-6, and TNF-α (5). It is likely to be responsible for the expansion and increase of permeability of the blood vessels of the thyroid gland, which can lead to pathological changes in the structure and function of the thyroid gland (6). CRP, like other acute-phase proteins, is synthesized in hepatocyte in response to microbial infection, tissue injury, and autoimmune disorders; induced by IL-1 and IL-6 (7,8). Interleukin-6 is a pivotal cytokine with diverse physiological functions that include regulation of immune cell proliferation and differentiation (9). The anti-inflammatory action of IL-6 promotes physiological cell function by binding to the
IL-6 also controls homeostatic function such as hypothalamic-pituitary-adrenal axis [12]. Generally, cytokines directly down-regulate several components of the thyroid hormones synthesis pathway at the thyrocyte [13]. This study aimed to estimate IL-6 and CRP levels in autoimmune and non-autoimmune hypothyroidism.

**Materials and Method**

Sixty Iraqi female hypothyroid patients were rounded up from The National Center for Endocrine Disease and Diabetes; their ages ranged between (24-50) years. Patients were divided to two groups, 30 autoimmune hypothyroid and 30 non-autoimmune hypothyroid patients. Beside 30 volunteers female subjects as control, their ages and gender were matched with patients ranged between (27-52) years.

Approximately (4ml) of human blood was collected intravenously from patient and control groups. Certain exception criteria were followed to exclude unsuitable subjects. All patients and control had no complained of other chronic or systemic diseases. Diagnosis of hypothyroidism was based on clinical features and serum thyroid hormones levels (TSH, T4 and T3) by using automated Chemiluminescence Immunoassay (CLIA) analysis system produced by Shenzhen New Industries Biomedical Engineering Co., Ltd (SNIBE). Thyroid antibodies (TPO-Abs and Tg-Abs) were measured by commercially available ELISA kits from (MyBiosorcem, USA). Also, detection of IL-6 serum level was measured by using ELISA kit from (MyBiosorcem, USA). Latex Agglutination Slide Test for Qualitative and Semiquantitative used for determination of C-reactive protein in non-diluted serum by using commercially available kit, The HUMATEX CRP kit from (Human comp., Germany).

Statistical Analysis System- SAS program was used to identify the effect of different factors in study parameters. The variables were described by mean ± standard error (SE) and tested for statistical significance by t-test.

**Results and Discussion**

The results of this study in table-1 showed that serum levels of thyroid stimulating hormone (TSH) are increased significantly (p<0.01) in autoimmune and non-autoimmune groups (10.69± 0.56 and 10.05± 0.47 μIU/ml) respectively, as compared to serum level of control group (5.99 ± 0.25 μIU/ml). On the other hand, mean level of serum thyroxin (T4) and triiodothyronine (T3) in autoimmune patients group (3.48 ± 0.29 and 0.560 ± 0.03 ng/ml) and in non-autoimmune group (3.49± 0.20 and 0.567± 0.02) respectively, are decreased significantly (P<0.01) as compared to T4 and T3 levels in control group (6.12± 0.37 and 0.813± 0.04 ng/ml). There are no significant differences (p>0.05) between hormones (TSH, T4 and T3) levels in autoimmune group (10.69± 0.56, 3.48 ± 0.29 and 0.560 ± 0.03) and non-autoimmune group (10.05 ± 0.47, 3.49 ± 0.20 and 0.567 ± 0.02) consistently (Table 1).

**Table 1: Serum thyroid hormones level in study groups**

<table>
<thead>
<tr>
<th>The Group</th>
<th>Mean ± SE (Median)</th>
<th>T4 (ng/ml)</th>
<th>T3 (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoimmune thyroiditis (N=30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSH (μIU/ml)</td>
<td>10.69 ± 0.56 a</td>
<td>3.48 ± 0.29 b</td>
<td>0.560 ± 0.03 b</td>
</tr>
<tr>
<td></td>
<td>(7.62)</td>
<td>(3.06)</td>
<td>(0.517)</td>
</tr>
<tr>
<td>Non-Autoimmune thyroiditis (N=30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSH (μIU/ml)</td>
<td>10.05 ± 0.47 a</td>
<td>3.49 ± 0.20 b</td>
<td>0.567 ± 0.02 b</td>
</tr>
<tr>
<td></td>
<td>(7.22)</td>
<td>(3.21)</td>
<td>(0.528)</td>
</tr>
<tr>
<td>Control (N=30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TSH (μIU/ml)</td>
<td>5.99 ± 0.25 b</td>
<td>6.12 ± 0.37 a</td>
<td>0.813 ± 0.04 a</td>
</tr>
<tr>
<td></td>
<td>(4.02)</td>
<td>(5.78)</td>
<td>(0.709)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.0001**</td>
<td>0.0001**</td>
<td>0.0001**</td>
</tr>
</tbody>
</table>

**: (P<0.01), a: is differ significantly than b in the same column
These results confirmed the diagnosis of hypothyroidism which is characterized by elevated TSH and decline T4 and T3 hormone levels as compared with control.

Thyroid antibodies were measured to confirm the presence of autoimmune thyroiditis, as presented in table-2. The serum concentrations in autoimmune group of TPO-Ab and Tg-Ab are (259.61± 19.60 and 333.66 ±57.94 IU/ml) are increased significantly (p<0.01) than concentrations of TPO-Ab and Tg-Ab in non-autoimmune group (38.81± 3.25 and 14.49± 2.92); and in control group (37.72 ± 8.26 and 43.39 ± 8.61) respectively. There are no significant differences (p>0.05) between levels of antibodies in autoimmune and non-autoimmune groups (Table 2).

Table 2: Serum thyroid antibodies level in study groups

<table>
<thead>
<tr>
<th>The Group</th>
<th>Mean ± SE (Median)</th>
<th>Tg-Ab. (IU/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TPO-Ab. (IU/ml)</td>
<td></td>
</tr>
<tr>
<td>Autoimmune thyroiditis (N=30)</td>
<td>259.61 ± 19.60 *</td>
<td>333.66 ± 57.94 * (286.24)</td>
</tr>
<tr>
<td></td>
<td>(231.16)</td>
<td></td>
</tr>
<tr>
<td>Non-Autoimmune thyroiditis (N=30)</td>
<td>38.81 ± 3.25 b</td>
<td>14.49 ± 2.92 b</td>
</tr>
<tr>
<td></td>
<td>(28.94)</td>
<td>(19.02)</td>
</tr>
<tr>
<td>Control (N=30)</td>
<td>37.72 ± 8.26 b</td>
<td>43.39 ± 8.61 b</td>
</tr>
<tr>
<td></td>
<td>(27.55)</td>
<td>(15.12)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.0001**</td>
<td>0.0001**</td>
</tr>
</tbody>
</table>

** (P<0.01), a: is differ significantly than b in the same column

These results are coincidence with results of Krishan and Randhir (14) and Senthilkumaran et al. (15) explained that hypothyroidism established by decrease in T4 and T3 concentrations, this lead to hyper-secretion of pituitary TSH because of the negative feedback relationship between the different hormones. Furthermore, McCanlies et al. (16) defined HT with hypothyroidism by the presence of high titers of TPO-Ab or Tg-Ab and elevated levels of TSH in the absence of medication. As well, results of Xie et al. revealed that patients with HT have a great deal of clinical status; in general, it is an inconvertible process of evolving from euthyroidism to hypothyroidism and the positive TPO-Ab increases the probability of developing hypothyroidism (17).

These results in figure-1 are point toward the differences of serum CRP in study groups; there are significant increase (P<0.01) in positive ratio of autoimmune hypothyroid patient group (53.3%) than positive ratio of non-autoimmune group (43.3%). Similarly, the positive ratios of autoimmune and non-autoimmune groups (53.3% and 43.3%) respectively, increase significantly (P<0.001) than control group ratio (16.7%). While negative ratios in control group (83.3%) is increase significantly (P<0.01) than ratios in autoimmune and non-autoimmune (46.7% and 56.7%), sequentially. However, the negative percentages are elevated significantly (P<0.05) than positive percentages in non-autoimmune patient group (56.7% and 43.3%), respectively. In autoimmune patient group, the positive ratios are increase non-significantly (P>0.05) than negative ratio (Figure 1).
These results were agree with studies that detected elevated CRP in individuals with hypothyroidism; Tuzcu et al. (18) and Savas et al. (19) recorded that CRP was significantly elevated in hypothyroid patients and there was clear association between hypothyroidism and raised serum CRP. Likewise, Czarnywojtek and colleagues (20) reported that serum CRP concentration was increased in hypothyroidism. While, Pearce et al. reported in their study that serum CRP levels were similar in all types of thyroid disorder, where all types had positive CRP levels and the level in HT patients did not differ significantly from controls (21).

Conversely, Aksoy et al. (22) demonstrated for lacking difference in CRP levels in women with hypothyroidism compared to the control. As well, Sahin et al. did not detect any significant difference in high sensitivity-CRP (hs-CRP) levels among hypothyroid and subclinical hypothyroid with control groups (23).

Increasing in CRP among hypothyroidism might be due to the result of an interaction of IL-6 on TNF-α and IL-1. Additionally the lack of thyroid hormones causes a slower metabolic rate and hence results in with impaired biochemical processes. As a consequence CRP clearance rate may result with elevated serum CRP levels (20). Significant changes in serum inflammatory marker levels in patients with non-autoimmune thyroid dysfunctions strongly suggested that mild systemic inflammation exists in all types of thyroid diseases (24).

The results of table-3 explained for significant increase (p<0.01) in the serum level of IL-6 in autoimmune patients (32.17 ± 4.02 pg/ml) as compared with IL-6 levels in non-autoimmune patients and control groups (16.88 ± 3.79 and 20.42 ± 2.38 pg/ml) correspondingly. While, there are no significant differences (p>0.05) between levels of IL-6 in non-autoimmune patients group and control group.

<table>
<thead>
<tr>
<th>The Group</th>
<th>Mean ± SE (Median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autoimmune thyroiditis (N=30)</td>
<td>32.17 ± 4.02*</td>
</tr>
<tr>
<td></td>
<td>(16.20)</td>
</tr>
<tr>
<td>Non-Autoimmune thyroiditis (N=30)</td>
<td>16.88 ± 3.79b</td>
</tr>
<tr>
<td></td>
<td>(11.28)</td>
</tr>
<tr>
<td>Control (N=30)</td>
<td>20.42 ± 2.38b</td>
</tr>
<tr>
<td></td>
<td>(6.45)</td>
</tr>
<tr>
<td>P-value</td>
<td>0.013*</td>
</tr>
</tbody>
</table>

* (P<0.05), a: is differ significantly than b in the same column
The result of IL-6 is consistent with result of El-Shenawy et al. (25) indicated for significant increase in the level of IL-6 in Hashimoto patients as compared with control. As well, Marchiori et al. (26) showed that cytokine level is elevated in patients with autoimmune hypothyroid disease and decreased gradually after treatment. While Kammoun-Krichen et al. (27) demonstrated that serum IL-6 decreased significantly in hypothyroid group and increased significantly in hyperthyroidism than control group. Conversely, other previous studies reported by Mikos et al. (28) indicated that there was no significant difference in IL-6 level in hypothyroid patients than control.

Moreover, Rugerri et al. (29) agreed with our results as they stated that different cytokines released by immune cells caused thyroid cell damage and are involved in inflammatory processes, suggested that IL-6 is involved in the development of the disease in the different thyroid function status. However, Taddei et al. described higher serum CRP and IL-6 levels in patients with HT when compared to controls. They explained that the chronic activation of the immune system due to HT can lead to impaired endothelium dependent vasodilatation and IL-6 promotes atherogenesis indirectly by stimulating hepatic production of CRP (30).

In general, the changes in serum cytokine levels in thyroid diseases often provide controversial results but they remain essential for understanding the implication of cytokines in thyroid pathogenesis. In addition, serum cytokine levels may not reflect the intrathyroidal levels of some cytokines which may be low in the periphery, despite high tissue concentrations (27).

This study showed significant increase (P<0.01) in IL-6 level and CRP positive ratio in autoimmune hypothyroidism, that indicates to the effect of autoimmune thyroid disease on inflammatory markers IL-6 and CRP in the serum; and increase CRP positive ratio in non-autoimmune hypothyroidism suggested the alteration in the levels of inflammatory marker has been independent from etiology of thyroid disease.

Ethical Clearance

The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflicts of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


29. Rugerri, R. M.; Barresi, G. and Sciacchitano, S.

Assessment of Overweight and Obesity with Life Style among Secondary School Students in Al-Ramadi City

Ban Nadhum AL- Any

Department of community medicine, College of Medicine, University of Anbar, Iraq

Abstract

Overweight and obesity is a major health problem during adolescence which is related to lifestyle and behavioural factors. Assessment of overweight and obesity with life style among secondary school students in Al-Ramadi city.

A cross sectional study was conducted among 200 secondary school students in AL-Ramadi City during the period from March to April 2018.

For body Mass Index (BMI) > 25, the percentage was 40% for male and 20% for female students that mostly between age 17-18 years. More than half of male students had fatty, starchy food while 30% of female students had this type of food (with statically significance). According to habits 50%, 30% of male and female students had soft drinking/day respectively while for power drinking, 33% of male students and only 5% of females students had it daily (with statically significance). 70% of both sexes had tea with sugar for more than 3 times/day. For smoking 42% of male students were smokers while 3% of female students were smokers for less than 10 cigarette/day. 5% of males had euphoria drugs and 2% had alcohol for different times/week. 70% of students had family history of obesity (with statically significance). There was an association between overweight, obesity and diet according to sex (statically significance).

- Total 50% of obese student had normal hormonal assay, others didn’t do it.
- There was no history of medications, and all of them didn’t do any exercise.

There was high percentage of obesity and overweight mostly among male students who had unhealthy food pattern and habits, with lack of any exercise.

Keywords: Body mass index. Sex, Dietary pattern, habits.

Introduction

Obesity is an increasing of weight with fat accumulation while over weight is an increasing of weight for not more than 20% of normal body weight, according to height, physical activity, age and sex which may has a negative effect on health (1) People are considered overweight when the range of body mass index is between (25–30) kg/m² while considered obese when body mass index is more than 30 kg/m². (2) Obesity increases the risk of certain diseases as cardiovascular diseases, type 2 diabetes, disturb of sleep, cancer, depression and joint pain. (3,4) Obesity is mostly caused by combination of excessive food intake, lack of exercise, genetic and family susceptibility(5), physiological and endocrine disorders and some types of medications(6). The obese people with little eat can gain weight because of slow metabolism(7) and have a greater energy expenditure than the normal counterparts, that more energy is required to maintain the increasing of body mass(7,8) Obesity can be prevented by changing of dietary pattern, exercising, social changes, and personal choices(9). Quality of diet can be improved by reducing consumption of energy-dense foods, as food rich in fat and sugars, and increasing intake of food rich in fibre (3).

In Africa and Asia the prevalence of overweight among

Corresponding author:
Ban Nadhum AL- Any
E-mail: dr.ban.alani64@gmail.com
adolescents is below 10% while in the Americas and Europe is above 20%.\(^9\) wild word 39% of adolescents were overweight and 13% were obese in 2016\(^{10}\).

**Objectives:** Assessment of overweight and obesity with life style among secondary school students in Al-Ramadi city

**Materials and Method**

A cross-sectional study was conducted among 200 secondary school students for both sexes in AL-Ramadi City during the period from March to April 2018. The questionnaire included several questions as the following: Gender, family history of obesity, history of hormonal disturbance and medications, dietary pattern and habits related to obesity, life style as smoking, exercise, alcohol, drug abuse.

- A tape measure and a weighing scale were used to estimate the height and weight and calculated the BMI for each student according to the formula:

  \[
  BMI = \frac{Weight}{Height^2} (Kg/m^2).
  \]

  BMI ranges as the following: underweight < 18.5 kg/m\(^2\), normal weight:18.5-25, overweight:25-30, obese >30\(^{11}\). WHO cut-off point for overweight is 25 kg/m\(^2\)\(^{12}\).

**Statistical analysis**

The collected data was analyzed by using SPSS ver.16, Chi square test used, P value less than 0.05 was considered as the level of significance.

**Results**

Table (1) showed that 2% of students were 14 years old. For age group between 15-17 years, 55% of males and 32% of females were at this age respectively while for age group between 18-20 years, 43% of males and 65% of females were at this age respectively.

**Table 1: Distribution of age according to sex**

<table>
<thead>
<tr>
<th>Age</th>
<th>Male No.</th>
<th>Male %</th>
<th>Female No.</th>
<th>Female %</th>
<th>Total No.</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 years</td>
<td>2</td>
<td>2%</td>
<td>2</td>
<td>2%</td>
<td>4</td>
<td>2%</td>
</tr>
<tr>
<td>15-17 years</td>
<td>55</td>
<td>55%</td>
<td>33</td>
<td>33%</td>
<td>88</td>
<td>44%</td>
</tr>
<tr>
<td>18-20 years</td>
<td>43</td>
<td>43%</td>
<td>65</td>
<td>65%</td>
<td>108</td>
<td>54%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
<td>100</td>
<td>100%</td>
<td>200</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (2) showed that B.M.I below 18 was 4%, 10% for males and females respectively. For BMI between (18–25), the percentage was 56% for males and 70% for females while 20%,10% of males and females were between (25-30) respectively, same picture was seen for BMI more than 30 for both sexes.
Table 2: Distribution of B. M. I according to sex

<table>
<thead>
<tr>
<th>BMI</th>
<th>Gender</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18</td>
<td>Male</td>
<td>4</td>
<td>4%</td>
<td>10</td>
<td>10%</td>
<td>14</td>
<td>7%</td>
</tr>
<tr>
<td>18-25</td>
<td>Female</td>
<td>56</td>
<td>56%</td>
<td>70</td>
<td>70%</td>
<td>126</td>
<td>70.5</td>
</tr>
<tr>
<td>25-30</td>
<td>Male</td>
<td>20</td>
<td>20%</td>
<td>10</td>
<td>10%</td>
<td>30</td>
<td>15%</td>
</tr>
<tr>
<td>&gt;30</td>
<td>Female</td>
<td>20</td>
<td>20%</td>
<td>10</td>
<td>10%</td>
<td>30</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100%</td>
<td>100</td>
<td>100%</td>
<td>200</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (3), showed that 70% had family history of obesity with statically significance.

Table 3: Association between obesity and family history

<table>
<thead>
<tr>
<th>Family history</th>
<th>Obesity</th>
<th>+ve</th>
<th>-ve</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+ve</td>
<td>20</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>-ve</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>25</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 11.15, df=1, P \text{ value} > 0.05 \]

Table (4), showed that 67% of males had eggs with oil/day while 33% of females had them/day. 55% of male students had fatty dinner daily while 36% of females had it daily. 60% of male students had fast food daily while 30% of females had it/day. For males, 62% had added food daily while 40% of females had them daily. 66% of males had rice with bread daily while 34% of females had rice/day. 33%, 36% of males and females had rice with legumes daily respectively. For habits 42% of males were smokers for less than 10 cigarettes daily while only 3% of females had smoken cigarettes. 50%,30% had soft drinking’s daily for males and females respectively. 33% of males had power drinking’s daily while 5% of females had it daily. 51%, 50% of males and females had tea >3 times/day respectively. 2%,5% of males had alcohol, drugs respectively/week.

Table 4: distribution of Diet and Habits according to sex

<table>
<thead>
<tr>
<th>Diet</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily No.</td>
<td>%</td>
</tr>
<tr>
<td>Egg+ oil</td>
<td>67</td>
<td>67%</td>
</tr>
<tr>
<td>fatty dinner</td>
<td>55</td>
<td>55%</td>
</tr>
<tr>
<td>Fast food</td>
<td>60</td>
<td>60%</td>
</tr>
<tr>
<td>Added food</td>
<td>62</td>
<td>62%</td>
</tr>
<tr>
<td>Rice+ bread</td>
<td>66</td>
<td>66%</td>
</tr>
<tr>
<td>Rice+ Legumes</td>
<td>33</td>
<td>33%</td>
</tr>
</tbody>
</table>
Table (5), showed that there was 15% of obese males had egg with oil daily, 10% of females had egg with oil daily. For fast food, 25% of males had it while 15% of obese females had fast food daily, 25% of obese males had fatty dinner while 15% of obese females had fatty dinner, 25% of males had added food daily while 10% of females had added food, 15% of obese males had rice with bread while 25% of obese females had rice with bread, 7.5% of males had rice and legumes while 25% of female had rice and legumes. It was statically significant, p value<0.05.

Table 5: Association between Overweight - Obesity and Diet according to sex

<table>
<thead>
<tr>
<th>Diet</th>
<th>Obesity</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg with oil</td>
<td>15%</td>
<td>10</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>Fast food</td>
<td>25%</td>
<td>3</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Fatty dinner</td>
<td>12.5%</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Added food</td>
<td>25%</td>
<td>5</td>
<td>25%</td>
<td>12</td>
</tr>
<tr>
<td>Rice+bread</td>
<td>15%</td>
<td>6</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Rice+legumes</td>
<td></td>
<td>3f</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>40</td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

\[\chi^2 = 12.14, df=5 , P value < 0.05\]

Table (6), showed that there was 25% of both sexes had gas drinking’s, power drinking’s daily. 25%, of males had drinking tea daily while 50% of females had drinking tea daily. 25% of males were smokers daily while no females were smokers. IT was statically significance, p value<0.05. 5%, 2% of male students had drugs and alcohol respectively.

- Total 50% of obese student had normal hormonal assay, others didn’t do it.
- There was no history of medications, and all of them didn’t do any exercise.

Table 6: Association between Overweight- Obesity and Habits according to sex

<table>
<thead>
<tr>
<th>Habits</th>
<th>Obesity</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas drinking</td>
<td>10</td>
<td>10</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Power drinking</td>
<td>5</td>
<td>5</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Tea with sugar</td>
<td>15</td>
<td></td>
<td></td>
<td>60</td>
</tr>
<tr>
<td>Smoking</td>
<td>10</td>
<td></td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

\[\chi^2 = 16.8, P value < 0.05\]
Discussion

The study revealed that 40%, 20% of male and female students had BMI >25, mostly between age of 17-18 years which was agree with a study mentioned that the prevalence of overweight and obesity is increasing among boys (13), a study in America said that the prevalence of BMI >25 among 2nd school students is 31% (14). Consumption of sugar soft drinks may cause childhood obesity, that in a study among children over 12 years the obesity increased 1.6 times for every additional soft drink consumed per day. (15) Eating fast food is very common among young people with 75% of students consuming fast food in a given week (16,17), carbohydrate overfeeding produced 75–85% excess energy being stored as body fat and fat overfeeding produced 90–95% storage of excess energy as body fat (18). When people eat outside the home, they consume more total calories and fat per eating occasion than they do at home. 70% of obese students had family history of obesity that Adolescents and their families eat more fast food than in the past. All students were failed to do exercises that because of spending whole time on using computer, playing games or watching television. 21.5% of children are likely to be overweight when watching four hours and more of television/day, 4.5% of children are likely to be overweight when using a computer one hour or more /day(19).

Conclusion

There was a high percentage of obesity and overweight mostly among male students who had consumption of diet rich with fat, carbohydrate, imbalance habits with lack of exercise.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References

7- Robert Kushner. Treatment of the Obese Patient (Contemporary Endocrinology). Department of Medicine, Northwestern University, Feinberg School of Medicine, Chicago, IL. Totowa: Humana Press. SeriesIII.Chapter 8. 2007, P:158.


A Comparison Study among Several Tumor Markers in Serum Samples of Patients with Colon Cancers

Rasha Hasan Jasim
Department of Chemistry, Faculty of Education for Girls, University of Kufa, Iraq

Abstract

During six years ago, 109 patients with malignant colon cancers at metastasis stages (II to IV stages), 112 patients “as a pathological control group”, and 85 healthy individuals were enrolled in the present work. CLEC4E, CEA, CA 19-9, and Serotonin levels were measured in the sera of study individuals using sandwich ELISA technique. Current study demonstrated significant increase in the levels of CLEC4E, CEA, and CA 19-9 in the malignant colorectal cancers comparison to pathological controls as well as healthy individuals. Serotonin levels were seemed to be lower at cancerous patients comparison to healthy controls. CLEC4E may be used as a definitive diagnostic marker for cancers than other nonmalignant diseases, moreover CLEC4E and serotonin can be considered as new diagnostic tools for colon cancer and are highly effective follow-up tools and can be diagnostic and follow-up tools when measured with other resident parameters. Measured parameters (CLEC4E, CEA, CA19-9, and Serotonin) can be effective screening tools when diagnosing tumor infections in the colon.

Keywords: CLEC4E, CEA, CA 19-9, Serotonin, Colorectal.

Introduction

Statistically, Iraq tops the Arab countries and East Asian countries in terms of the number of people with cancer, with 135 cases per 100,000 people. Colorectal cancer is one of the most serious cancers, with the most common cancers and the second leading cause of death due to cancer in the world. Annually, the number of new colon cancer infections is estimated at 1.4 million worldwide and the number of deaths is 694 thousand every year. According to the American Cancer Society, colon cancer is the third leading cause of cancer-related death in the United States, accounting for about 10 percent of all cancer deaths, while it is the fourth leading cause of death in the Middle East, with more than 15,000 infections annually. According to the latest statistics provided by the Iraqi Ministry of Health and Environment for the year 2017, colorectal cancer is among the ten most common cancers in Iraq, while this type of cancer is the fifth most common cancers in the province of Najaf with a number of 356 proven cases.

Colorectal cancer, also called colon cancer, rectal cancer or bowel cancer almost always occurs in the large bowel - cancer of the small bowel is rare. Symptoms of colorectal cancer include blood in your stools, a change in normal bowel habits, a lump that your doctor can feel in your back passage, weight loss, pain in the abdomen or back passage, and anemia.

There are many factors that directly affect the risk of colorectal cancer, alcohol is considered the main cause of these factors, followed by smoking and bad eating habits, which include eating foods that contain high saturated fat, especially fast food. Recent study indicates that laziness and long sitting position increases the risk of developing this type of cancer. Genetics is one of the most influential factors in raising the risk of colorectal cancer, medical data indicates that one out of every 20 colon cancer cases is due to genetic causes, indicating that the disease can be prevented by early detection.

Occurrence and mortality rates have been declining for several decades because of historical changes in risk factors (eg, decreased smoking and red
meat consumption and increased use of aspirin), the introduction and dissemination of screening tests, and improvements in treatment. Treatment of colon cancer depends on where the cancer is in the bowel and how far it has metastases but may include surgery, chemotherapy and radiotherapy\textsuperscript{(11-13)}.

The current work was designed to assess the ability of four chemical parameters to detect colorectal cancer and to compare non-cancerous colon diseases with the levels of these standards in healthy individuals on the one hand, as well as the effectiveness of surgical and non-surgical treatments (chemotherapy or radiation) Follow-up of recorded response throughout the treatment period and beyond.

Both CEA\textsuperscript{(14-17)} and CA19-9\textsuperscript{(18-31)} were studied and evaluated in different cancer diseases, including colon cancer, which were selected in the current work to evaluate their efficiency as a difference between cancerous tumors from non-cancerous as well as study the possibility of using them as tools in follow-up\textsuperscript{(32-35)}.

Serotonin levels have been monitored in many pathological and unsatisfactory cases and have been shown to change levels in many of the cancer cases, including the injuries of a number of parts of the nervous system, but it was not evaluated independently in patients with cancerous colorectal or even non-cancerous\textsuperscript{(36-40)}.

**Materials and Method**

**Patients and Healthy Controls:** During six years ago, 109 patients (47.694 ± 21.325, with the age range 27-75 years) with malignant colon cancers at metastasis stages (II to IV stages), 112 patients (39.528 ± 18.502, with the age range 25-65 years) “as a pathological control group” included 27 patients with benign colorectal tumors and 85 patients with non-tumoral colorectal illness; i.e. irritable bowel syndrome, colon ulcers, and colon infection, and 85 healthy individuals (33.261 ± 19.592, with the age range 22-67 years) were enrolled in the present work. Full data were summarized in Figure 1.

**Figure 1: Distribution of Study Groups According to the Gender**

MCTPs: Malignant Colon Tumor Patients, PCs: Pathological Controls, and HCs: Healthy Controls

The enrolled patients (malignant colorectal cancers individuals and pathological controls) were collected from several public and private hospitals in addition to centers in Al-Najaf Al-Ashraf governorate; involved: Liver and GIT Center in Al-Sadder Medical City, Al-Ameer Privet Hospital, Al-Ghadeer Hospital, Middle Euphrates Cancer Center, and Daily Specialized Najaf Clinic.

Initial diagnosis of colorectal cancer (before chemotherapy) was performed by specialist physicians and through a range of clinical and laboratory tests. The full information about the current study patients was provided through oral interviews with patients and in cooperation with the supervising physicians. According to the questionnaire in the current work
questionnaire prepared in advance based on the opinion of the specialists, including the age, gender, location and history of the patient as well as the number of individuals with colon cancer or any other type of cancers in the family.

Selection of healthy individuals as a control group based on several criteria included: an absence of major medical or surgical illness in the previous 5 years, no hospital admissions, no current GIT medication, and a subjective perception of good health as determined by health questionnaire. More than, control group might at approximate age range with the patients group, with similar food style.

**Serum Samples Collection:** Five milliliters of venous blood samples were collected from the patients and healthy individuals, after fasting period more than eight hours. Samples were allowed to clot at lab temperature, centrifuged at 5000xg for 5 minutes. Sera were collected and stored at -18°C until used.

**Methods:** Sandwich-ELISA technique was applied to estimate levels of the evaluated parameters prepared by Elabscience Company, China.

**Results and Discussion**

The current study included 306 patients in three groups including the first 109 individuals with colorectal cancer according to the diagnosis of the specialist doctors whose serological samples were taken when they were diagnosed with the disease and during the stages of receiving chemotherapy. The second group included 112 patients with non-cancerous colon diseases whose serological samples were approved as a satisfactory control group. The last group included the healthy individuals who were elected to participate in the current study as a control group based on a set of strict criteria set out in the questionnaire prepared by specialists.

Before treatment, **Table 1** demonstrated significant increase in the levels of CLEC4E, CEA, and CA 19-9 in the malignant colorectal cancers comparison to pathological controls as well as healthy individuals, while no significant variation were observed when the pathological and healthy controls were compared together.

Table 1: Levels of CLEC4E, CEA, CA 19-9, and Serotonin (Mean ± S.D.) in Sera of Malignant Colorectal Tumor Patients, Pathological Controls, and Healthy Controls Subjects

<table>
<thead>
<tr>
<th>Evaluated Parameters</th>
<th>Subjects (n.)</th>
<th>Mean ± S.D.</th>
<th>Minimum - Maximum</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MCTPs (109)</td>
<td>PC (112)</td>
<td>HCs (85)</td>
<td>MCTPs vs HCs</td>
</tr>
<tr>
<td>CLEC4E (pg / ml)</td>
<td>0.486 ± 0.197</td>
<td>0.295 ± 0.183</td>
<td>0.235 ± 0.241</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>0.263 - 0.721</td>
<td>0.182 - 0.428</td>
<td>0.110 - 0.379</td>
<td></td>
</tr>
<tr>
<td>CEA (ng / ml)</td>
<td>3.321 ± 0.124</td>
<td>2.021 ± 0.409</td>
<td>1.202 ± 0.241</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>0.283 - 4.527</td>
<td>0.201 - 3.011</td>
<td>0.341 - 2.241</td>
<td></td>
</tr>
</tbody>
</table>
Table 1: Levels of CLEC4E, CEA, CA 19-9, and Serotonin (Mean ± S.D.) in Sera of Malignant Colorectal Tumor Patients, Pathological Controls, and Healthy Controls Subjects

<table>
<thead>
<tr>
<th></th>
<th>MCTPs</th>
<th>PCs</th>
<th>HCs</th>
<th>MCTPs vs HCs</th>
<th>MCTPs vs PCs</th>
<th>PCs vs HCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA 19-9 (U / ml)</td>
<td>148.767 ± 12.026</td>
<td>75.821 ± 9.588</td>
<td>31.211 ± 4.521</td>
<td>0.000</td>
<td>0.050</td>
<td>0.702</td>
</tr>
<tr>
<td>Serotonin (ng / ml)</td>
<td>0.521 ± 0.212</td>
<td>0.674 ± 0.277</td>
<td>1.362 ± 0.383</td>
<td>0.000</td>
<td>0.824</td>
<td>0.005</td>
</tr>
</tbody>
</table>

MCTPs: Malignant Colon Tumor Patients, PCs: Pathological Controls, and HCs: Healthy Controls

In fact, the current study failed to detect significant variations between the two genders in the group of patients with cancer or non-cancerous colorectal diseases, as well as, when comparing males with females in the control group when measuring the levels of four parameters, but the study created a set of individual observations when comparing gender, included:

1. The highest levels of CLEC4E (0.721 pg/ml) as well as CEA (4.527 ng/ml) were recorded at cancerous male patients at 73 years old in the end stage of colon cancer, while the lowest level of CLEC4E (0.110 pg/ml) was recorded in the case of healthy male at 25 years old, while the lowest levels of CEA was recorded in a 28-year-old woman with Irritable Bowel Syndrome.

2. The highest levels of CA 19-9 (188.552 U/ml) was observed in the sample of cancerous patients at stage IV at 56 years old, on the other hand, the lowest levels of this parameter (24.614 U/ml) was showed at 31 years old healthy female.

3. Serotonin among the studied tumor markers showed close values in the lowest levels of the two sexes in the group with colon cancer, while the highest levels of this hormone were recorded in healthy women group and the highest levels were observed in samples of women between the ages of thirty and forty, more over; the current study illustrated that the lowest levels of this hormone (and nearly to their levels in the colon cancer cases) were found in male patients with Irritable Bowel Syndrome.

4. The study reported an increase in BMI of 38 Kg / m² for more than 60% of women with colon cancer, whereas BMI was only 52% of those with colon cancer. In the pathological control group, 80% of patients with non-cancerous colon disease were seemed to be extremely obese, while exiguity was observed in patients with bleeding ulcers only.

5. Regardless of age and stage of infection, it was observed that male patients were more committed than women to the doctor’s instructions and more in compliance with the orders for treatment, whether surgical or pharmacological.

In order to assess the efficacy of the four tumor markers in detecting colon cancer, the percentage sensitivity of each marker was calculated individually. To increase the efficiency of the initial diagnosis of colorectal cancer which leads to more effective treatment of this type of cancer, the percentage of sensitivity of the markers assessed together, Table 2.

Table 2: Single and Linked Sensitivity Percentage of The Evaluated Parameters at Diagnosis

<table>
<thead>
<tr>
<th>Evaluated Parameters</th>
<th>CLEC4E</th>
<th>CEA</th>
<th>CA 19-9</th>
<th>Serotonin</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEC4E</td>
<td>94</td>
<td>100</td>
<td>97</td>
<td>100</td>
</tr>
<tr>
<td>CEA</td>
<td>100</td>
<td>88</td>
<td>93</td>
<td>100</td>
</tr>
<tr>
<td>CA 19-9</td>
<td>97</td>
<td>93</td>
<td>72</td>
<td>98</td>
</tr>
<tr>
<td>Serotonin</td>
<td>100</td>
<td>100</td>
<td>98</td>
<td>92</td>
</tr>
</tbody>
</table>
The level of specialization of the four tumor markers were evaluated to determine the efficacy of these parameters to distinguish between carcinogenicity and non-cancerous colon disease, Table 3.

**Table 3:** Single and Linked Specificity Percentage of The Evaluated Parameters

<table>
<thead>
<tr>
<th>Evaluated Parameters ▼</th>
<th>CLEC4E</th>
<th>CEA</th>
<th>CA 19-9</th>
<th>Serotonin</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLEC4E</td>
<td>87</td>
<td>92</td>
<td>91</td>
<td>97</td>
</tr>
<tr>
<td>CEA</td>
<td>92</td>
<td>73</td>
<td>82</td>
<td>91</td>
</tr>
<tr>
<td>CA 19-9</td>
<td>91</td>
<td>82</td>
<td>65</td>
<td>86</td>
</tr>
<tr>
<td>Serotonin</td>
<td>97</td>
<td>91</td>
<td>86</td>
<td>82</td>
</tr>
</tbody>
</table>

Figure 2 shows a significant reduction in the levels of CLEC4E, CEA, and CA 19-9 after receiving the first dose of chemotherapy followed by a gradual decrease in levels of these markers with progression of doses received, while serotonin levels were elevated sequently with the doses of chemotherapy.

Figure 2: Alteration in The Levels of The Four Evaluated Parameters at Diagnosis and Through The Different Treatment Stages with Chemotherapy

Results of the present study showed statistically significant decrease in the levels of CLEC4E, CEA, and CA 19-9 in the sera of colon cancer patients after treatment compared to their levels at primary diagnosis, while the results indicated a significant increase in levels of serotonin in the samples of patients with cancerous disease after treatment by chemotherapy compared to their corresponding levels at diagnosis, as shown in Table 4.
Table 4: Comparison Between Levels of CLEC4E, CEA, CA 19-9, and Serotonin (Mean ± S.D.) in Sera of Malignant Colorectal Tumor Patients Subjects at Diagnosis and After Treatment by Chemotherapy.

<table>
<thead>
<tr>
<th>Evaluated Parameters</th>
<th>Subjects Mean ± S.D.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At Diagnosis MCTPs</td>
<td>After Treatment MCTPs</td>
</tr>
<tr>
<td>CLEC4E (pg / ml)</td>
<td>0.486 ± 0.197</td>
<td>0.243 ± 0.121</td>
</tr>
<tr>
<td>CEA (ng / ml)</td>
<td>3.321 ± 0.124</td>
<td>1.632 ± 0.203</td>
</tr>
<tr>
<td>CA 19-9 (U / ml)</td>
<td>148.767 ± 12.026</td>
<td>77.954 ± 24.262</td>
</tr>
<tr>
<td>Serotonin (ng / ml)</td>
<td>0.521 ± 0.212</td>
<td>0.831 ± 0.322</td>
</tr>
</tbody>
</table>

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References
1. Rebecca L; Kimberly D; Stacey A; Dennis J; Reinier G. S; Afsaneh Barzi; Ahmedin J. CA Cancer J Clin.; 2017, 67:177-193.
17. Charlotte V. Thesis project number 171002209, Michal Slawinski, the Netherlands. 2016.
38. Sarrouilhe D, Clarhaut J, Defamie N, and Mesnil M. Current Molecular Medicine, 2015, 15, 62-77.
Nurses’ Knowledge Toward Hydatidiform Mole Pregnancy in The Women’s Hospital and Obstetrics in the Holy City of Kerbala

Fatma Makee Mahmood¹, Gahda Ali Hashim², Zahra Maki Mahmood AL-Hakak³, Selman Hussain Faris⁴

¹Adult Nursing Department, ²Maternal and Neonatal Nursing Department, College of Nursing, University of Kerbala, Iraq, ³AL-Furat Al-Awsat Technical University, Technical Institute of Kerbala, Iraq, ⁴Community Nursing Department, College of Nursing, University of Kerbala, Iraq

Abstract

In utero molar, an abnormal fertilized egg is implanted in the womb (uterus). Cells that become placenta grow very rapidly and control the space in which the fetus usually develops. These cells are called trophoblasts. Knowledge of nurses towards hydatidiform mole evaluates and determines the relationship between knowledge of nurses towards hydatidiform mole and demographic characteristics.

Descriptive study was conducted in the Women’s Hospital and Obstetrics teaching hospital in the holy city of Kerbala from 15/02/2016 to 15/10/2016 to achieve objectives of the study were selected sample is the possibility (object-) consisted of (70) nurses working in the Women’s Hospital and Obstetrics teaching hospitals. The study tool consists of two parts, the first part demographic information, the second part assess nurses’ knowledge and includes three sections; Section I: Knowledge nurses toward hydatidiform mole, Section II: Knowledge about the causes of hydatidiform mole, Section III: knowledge about preventive measures.

Results of the study showed that (45) nurses, was down (64.3%) were in the age group (24-30 years), and (45) nurses, by (64.3%) junior nursing graduates, and 38 nurses, by (54.3%) were married, (1-3) was the years of experience (20) nurses, was down (28.5%), and (41) nurses, by (58.5%) did not participate in the training sessions. The results showed that there was anon significant difference in the level of (P <0.05) and that most of the nurses have an average knowledge of the direction of hydatidiform mole, there is no significant correlation between the knowledge of nurses and level of education, age and marital status with the exception of years of experience.

The study recommends the following: activating the role of training and development to improve knowledge and attitudes of nurses, health awareness trend pregnancy, The distribution of brochures, pamphlets for nurses, guidance on obstetrics and midwifery.

Keywords: Hydatidiform Mole, nurse’s knowledge, Hospitals

Introduction

Hydatidiform Mole (HM) is a spectrum of abnormal gestations arising from villous trophoblastic associated with pregnancy (¹). HM has two histological types, including partial hydatidiform mole (PHM) and complete hydatidiform mole (CHM) (²). HM is among gestational trophoblastic disease (GTD) and others include choriocarcinoma and placenta site trophoblastic tumors that arise from villous trophoblast and interstitial trophoblast respectively (¹). In a “complete mole,” no normal fetal tissue forms. In a “partial mole,” incomplete fetal tissues develop alongside molar tissue. These two
conditions are noncancerous (benign) and make up 80 percent of cases. Three malignant forms of gestational trophoblastic disease occur, including invasive molar pregnancy, choriocarcinoma and placental site trophoblastic tumors (3). Most molar pregnancies are noncancerous and confined to the uterus (hydatidiform moles). In this type of mole, the abnormal placental tissue has villi, clusters of tissue swollen with fluid, giving it the appearance of a cluster of grapes. If a fetus begins to develop along with a hydatidiform mole, it typically has many malformations and almost never can be delivered as a living baby (4). A more aggressive tumor associated with molar pregnancies is an invasive mole, also called chorioadenomadestruens. The invasive mole contains many villi, but these may grow into or through the muscle layer of the uterus wall. Rarely, invasive moles can cause bleeding by perforating the uterus through its whole thickness. In 15% of cases, an invasive mole can spread to tissues outside of the uterus (5). Choriocarcinomas can cause persistent bleeding in the weeks or months after delivery, but this happens very rarely. (Most bleeding like this is not caused by a choriocarcinoma). Choriocarcinomas associated with molar pregnancies almost always follow complete moles rather than partial moles (4,5). Some women will have no noticeable symptoms of molar pregnancy, or may recognize them only after they have been diagnosed. This is because most of the symptoms are due to very high levels of the pregnancy hormone hCG (human chorionic gonadotrophin), so they can be very like the usual symptoms of pregnancy or miscarriage (6). HM has several etiological risk factors and the most established are extreme of maternal age and prior molar pregnancy (7-9). For instance, the risk of complete mole increases threefold for women older than forty years and is much higher in patient with previous history of molar pregnancy (10, 11). The experience of hydatidiform mole can be very distressing. Not only have you experienced a miscarriage but also they need to be in continued medical follow-up to have your hCG levels checked (10). The importance of this study come from that nurses need to know about causes, sign and symptoms, complications, reducing, treatment , and to assess and give care for those women.

Materials and Method

Descriptive study was conducted on hydatidiform mole pregnancy data collected started from 15/02/2016 to 15/10/2016 to in order to assessment for nurses’ knowledge toward HM pregnancy. The study was carried out in the women’s hospital and obstetrics in the holy city of Kerbala. Non- probability (purposive) sample of (50) nurses working in Women’s Hospital and Obstetrics teaching hospital the samples have been selected based on the following criteria: Select the nurses have been working in all the hospitals in delivery rooms and have been asking questions about Hydatidiform Mole pregnancy information. The questionnaire was designed and constructed by the investigators to measure the variable underlying the study. A questionnaire was consisted of two parts:-

Part 1: It includes 3 items about demographical information such as (nurse’s age, educational level, and experience years).

Part 2:- It comprised of structured items concerning nurse’s knowledge toward Hydatidiform Mole pregnancy and comprised of (14) items. These item were developed according to (3) levels Liker Scale as (I know - I do not know - Not sure) and the scale was scored as (1) I know, (2) not sure and (3) for I don’t know. Validity of the questionnaire, the content validity of the study instruments questionnaire format was determined initially through a panel of (5)from different related specialties and agencies. Data analysis: The data were analyses through application of the SPSS program and used both the descriptive and inferential statistical approaches.
Results

Table 1: Distribution of the Study Sample by their General Information

<table>
<thead>
<tr>
<th>Variables</th>
<th>Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age Group</td>
<td>Age Group</td>
</tr>
<tr>
<td></td>
<td>20-30</td>
</tr>
<tr>
<td>F.</td>
<td>%</td>
</tr>
<tr>
<td>18</td>
<td>36.0</td>
</tr>
<tr>
<td>Total</td>
<td>50(100%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Secondary Graduate</th>
<th>Instituted Graduate</th>
<th>Collage Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.</td>
<td>%</td>
<td>F.</td>
<td>%</td>
</tr>
<tr>
<td>21</td>
<td>42.0</td>
<td>15</td>
<td>30.0</td>
</tr>
<tr>
<td>14</td>
<td>28.0</td>
<td>14</td>
<td>28.0</td>
</tr>
<tr>
<td>Total</td>
<td>50(100%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience Years</th>
<th>1-5</th>
<th>6-10</th>
<th>11-15</th>
<th>16-20</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.</td>
<td>%</td>
<td>F.</td>
<td>%</td>
<td>F.</td>
</tr>
<tr>
<td>25</td>
<td>50.0</td>
<td>18</td>
<td>36.0</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>50.0</td>
<td>18</td>
<td>36.0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>50(100%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F. = Frequency, %= Percentage

This table shown that the study sample age group at (31-40) have more than one third (48%), their level of education at secondary nursing graduate have (42%) , and they (50%) half of the study sample have (1-5) experience years.

Table 2: Distribution of the Study Sample by their Knowledge about the Hydatidiform Mole Pregnancy

<table>
<thead>
<tr>
<th>Variables</th>
<th>I Know</th>
<th>Not Sure</th>
<th>I Don’t Know</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.</td>
<td>%</td>
<td>F.</td>
<td>%</td>
<td>F.</td>
</tr>
<tr>
<td>Hydatidiform mole pregnancy is a dominance of genetic traits from one side</td>
<td>14</td>
<td>28.0</td>
<td>27</td>
<td>54.0</td>
</tr>
<tr>
<td>Hydatidiform Mole pregnancy types are (complete and partial)</td>
<td>10</td>
<td>20.0</td>
<td>25</td>
<td>50.0</td>
</tr>
<tr>
<td>Detect Hydatidiform Mole pregnancy by pregnancy test</td>
<td>20</td>
<td>40.0</td>
<td>15</td>
<td>30.0</td>
</tr>
<tr>
<td>Red light vaginal bleeding at the first trimester</td>
<td>21</td>
<td>42.0</td>
<td>25</td>
<td>50.0</td>
</tr>
<tr>
<td>Rapidly infatuation of the uterus size</td>
<td>26</td>
<td>52.0</td>
<td>22</td>
<td>44.0</td>
</tr>
<tr>
<td>Cyst formed grapes is exist</td>
<td>37</td>
<td>74.0</td>
<td>13</td>
<td>26.0</td>
</tr>
<tr>
<td>Can rid Hydatidiform mole pregnancy</td>
<td>40</td>
<td>80.0</td>
<td>7</td>
<td>14.0</td>
</tr>
<tr>
<td>Hydatidiform Mole pregnancy may turn to a rare type of tumor</td>
<td>7</td>
<td>14.0</td>
<td>24</td>
<td>48.0</td>
</tr>
<tr>
<td>Fertilized egg in the complete Hydatidiform Mole pregnancy was have 46 chromosomes</td>
<td>10</td>
<td>20.0</td>
<td>16</td>
<td>32.0</td>
</tr>
</tbody>
</table>

F. = Frequency, %= Percentage
This table shown that mostly study sample between half and more than two third have information about Hydatidiform Mole pregnancy, while the specific details (clinical information) information about that disease between not sure and don’t know.

Table 3: The Association between the Study Sample’s Knowledge and their Age Group

<table>
<thead>
<tr>
<th>Variables</th>
<th>Age Group/ Frequency</th>
<th>20-30(F.)</th>
<th>31-40(F.)</th>
<th>41-50(F.)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydatidiform mole pregnancy is a dominance of genetic traits from one side</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Hydatidiform Mole pregnancy types are (complete and partial)</td>
<td>6</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>Detect Hydatidiform Mole pregnancy by pregnancy test</td>
<td>11</td>
<td>2</td>
<td>5</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Red light vaginal bleeding at the first trimester</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Rapidly infatuation of the uterus size</td>
<td>12</td>
<td>6</td>
<td>0</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Cyst formed grapes is exist</td>
<td>16</td>
<td>2</td>
<td>0</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Can rid Hydatidiform mole pregnancy</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Hydatidiform Mole pregnancy may turn to a rare type of tumor</td>
<td>4</td>
<td>9</td>
<td>5</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Hydatidiform Mole pregnancy are deformities occurs in the placenta tissue</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>Fertilized egg in the partial Hydatidiform Mole pregnancy was have 69 chromosomes</td>
<td>3</td>
<td>4</td>
<td>11</td>
<td>7</td>
<td>12</td>
</tr>
</tbody>
</table>

P-Value≤0.05, *HS = Highly Significant

This table shown that has highly significant association with the study sample age group, while the other items have non-significant
### Table 4: The Association between the Study Sample's Knowledge and their Level of Education

<table>
<thead>
<tr>
<th>Variables</th>
<th>1 Know</th>
<th>Not Sure</th>
<th>I Don’t Know</th>
<th>Not Sure</th>
<th>I Know</th>
<th>Not Sure</th>
<th>I Don’t Know</th>
<th>Not Sure</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Level of Education/Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Graduate(F.)</td>
<td>6</td>
<td>10</td>
<td>5</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Instituted Graduate(F.)</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>10</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Collage Graduate(F.)</td>
<td>3</td>
<td>16</td>
<td>2</td>
<td>15</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>9</td>
<td>2</td>
</tr>
</tbody>
</table>

Detect Hydatidiform Mole pregnancy by pregnancy test

Red light vaginal bleeding at the first trimester

Rapidly infatuation of the uterus size

Cyst formed grapes is exist

Hydatidiform Mole pregnancy may turn to a rare type of tumor

Hydatidiform Mole pregnancy are deformities occurs in the placenta tissue

Fertilized egg in the complete Hydatidiform Mole pregnancy was have 46 chromosomes

P-Value≤0.05, *HS = Highly Significant

This table shown that highly significant association with their level of education, while the other items have non-significant.

### Table 5: the Association between the Study Sample’s Knowledge and their Years of Experience

<table>
<thead>
<tr>
<th>Variables</th>
<th>1 Know</th>
<th>Not Sure</th>
<th>I Don’t Know</th>
<th>Not Sure</th>
<th>I Know</th>
<th>Not Sure</th>
<th>I Don’t Know</th>
<th>Not Sure</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Years of Experience/ Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 (F.)</td>
<td>9</td>
<td>10</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>6-10 (F.)</td>
<td>7</td>
<td>13</td>
<td>5</td>
<td>2</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>11-15 (F.)</td>
<td>12</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>16-20 (F.)</td>
<td>4</td>
<td>14</td>
<td>7</td>
<td>2</td>
<td>8</td>
<td>8</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Fertilized egg in the complete Hydatidiform Mole pregnancy was have 46 chromosomes

P-Value≤0.05, *HS = Highly Significant
This table shown that highly significant association with their experience years, and the other items have non-significant.

Discussion

This study focused on the nurses’ knowledge toward Hydatidiform Mole pregnancy. Through the course of the present study (table 1) and (table 2), shows that the study sample age group at (31-40) have more than one third (48%), their level of education at secondary nursing graduate have (42%), and they (50%) half of the study sample have (1-5) years of experience, that’s mean when the nurses at middle age group and have more than 10 years working in the hospitals have more experience and more information about all the disease mostly maternity and children diseases.

Tables (3), (4), and (5) shows that complete Hydatidiform Mole pregnancy is the dangerous one, that deformities occurs in the placenta, fertilized egg in the partial it was have 69, and fertilized egg in the complete Hydatidiform Mole pregnancy was have 46 chromosomes chromosomes tissue have significant association with the study sample age group, while the other items have non-significant, with their level of education shows that Hydatidiform Mole pregnancy types are (complete and partial), red light vaginal bleeding at the first trimester, cyst formed grapes is exist, have a break for 6 months to one year period after Hydatidiform Mole pregnancy, it may turn to a rare type of tumor, it was deformity occurs in the placenta tissue have significant association, while the other items have non-significant, and finally with the study sample years of experience shown that Hydatidiform Mole pregnancy are deformities occurs in the placenta tissue item have significant association with their years of experience, and the other items have non-significant, that mean not all the nurses have specific information about the Hydatidiform Mole pregnancy and that’s agree with the study by Murray & McKinney (12). 

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


Role of MicroRNA-122 in Predicting Chronic Liver Diseases among Iraqi Patients with HCV

Leena Falh Abd Al Reda1, Dawood Salman Dawood1, Akram Ajeel Najeeb2
1Collage of Health & Medical Technology, Baghdad, Iraq, 2Consultant Gastroenterologist, Iraq

Abstract

MicroRNAs is play important roles in liver pathologies, including hepatitis, liver cirrhosis, and liver cancer. miRNA-122 is a liver-specific. This study aimed to determine the expression level of miRNA-122 in the plasma as a diagnostic marker of liver injury and the ratio of HCV genotype in Iraqi patients. A total of 80 participants who divided into; Group I included 35 patients with CHC infection, Group II included 20 patients with (cirrhosis &HCC) and Group III included 25 healthy control. HCV Genotype and miRNA-122 in the plasma were measured using real-time PCR. This study showed that the mean Log fold of miRNA-122 was higher in CHC group as comparison to controls while in the (cirrhosis&HCC) groups was non-significant in compared with controls. Moreover, the most prevalence genotype 4 then 1a. In conclusion measurements of miRNA-122 may be useful in the evaluation of HCV patients.

Keywords: Chronic Hepatitis C virus, Liver cirrhosis, Hepatocellular carcinoma, Genotype and miRNA-122.

Introduction

Hepatitis C virus (HCV) is associated with one of the major health problems in world that ultimate results in the liver cirrhosis and leads to carcinoma of hepatocellular components round the world. More than 185 million people were found to be infected with HCV (1). Hepatitis C is divided into six distinct genotypes throughout the world with multiple subtypes in each genotype class. A genotype is a classification of a virus based on the genetic material in the RNA (Ribonucleic acid) strands of the virus (2). MicroRNAs (miRNAs) are a broad class of small, noncoding endogenous single RNA molecules that function in gene expression through directly binding to the 3' untranslated region (3'UTR) of the target gene mRNA, resulting in mRNA cleavage or translational repression (3). MiRNAs have been implicated in the regulation of a wide range of important biologic processes, such as cellular growth and differentiation, developmental timing, apoptosis, and modulation of host response to viral infection (4). miRNA-122 is one of the miRNAs that is highly expressed in the liver, constituting 70% of the total miRNA pool. miRNA-122 is a target for extensive study due to its association with cholesterol metabolism and Hepatocellular carcinoma (HCC), and its important role in promoting HCV replication (5).

Materials and Method

Subject

This study was carried out on 80 patients who were divided into three groups: Group I: included a total of 35 cases (21 males and 14 females) of chronic hepatitis C patients whose age range was between (15-70) years. Group II: 20 cases (12 males and 8 females) of (LC &HCC) with age range between (28-70) years. Group III: 25 apparently healthy subjects with ages (18-60) years who were negative for HCV and HBV by ELISA. Participants were enrolled from the Gastroenterology and Hepatology Teaching Hospital and Dowaly Private Hospital in Baghdad, who registered during the period from June/2017 to Feb/2018. The clinical diagnosis was based on the decision of physician and testing for anti-HCV was repeated in all recruited anti-HCV-positive patients using a third-generation immunoassay and if this assay gave a positive result, a PCR technique was performed. Patients were selected if they had no other causes of liver disease, autoimmune or metabolic

DOI Number: 10.5958/0976-5506.2019.00933.1
disorders, HCC or co-infection with hepatitis B virus and/or human immunodeficiency virus, liver steatosis, malignancies, and current alcohol abuse.

**Molecular detection of miRNA-122**

Molecular detection of miRNA-122 was carried out according to (TaqMan™ MicroRNA Assay, inventoried, SM, Applied Biosystems, USA).

Detection the genotypes of HCV:

HCV Genotype detection according to (plus Real-TM HCV Real-TM Quant Dx, Sacace).

**Statistical Analysis**

Analysis of data was carried out using the available statistical package of SPSS-25 (Statistical Packages for Social Sciences- version 25). Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range (minimum-maximum values). The significance of difference of different means (quantitative data) were tested using Students-t-test for difference between two independent means or ANOVA test for difference among more than two independent means. The significance of difference of different percentages (qualitative data) were tested using Pearson Chi-square test ($\chi^2$-test) with application of Yate’s correction or Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05.

**Results**

The demographic data of the 55 patients with chronic liver disease and 25 controls are presented in table 1. There were 21 male (60%) and 14 female patients (40 %) in the CHC group. Their mean age was (39.5) years. There were 12 male (60%) and 8 female (40 %) patients in the (LC&HCC) group. Their mean age was (52.5) years. While in control group there were 13 male (52 %) and 12 female participants (48%) and the mean age was (35.9) years. The p-values of the differences among the ages and genders of these groups were (0.061, 0.798) respectively.

Table .1: The baseline characteristics of the studied groups.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Patients (LC&amp;HCC)</th>
<th>Control</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Range</td>
<td>15-70</td>
<td>28-70</td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>39.5±16.7</td>
<td>52.5±11.6</td>
</tr>
<tr>
<td>Gender</td>
<td>Male No. (%)</td>
<td>21(60.0)</td>
<td>12(60.0)</td>
</tr>
<tr>
<td></td>
<td>Female No. (%)</td>
<td>14(40.0)</td>
<td>8(40.0)</td>
</tr>
<tr>
<td>Total No.</td>
<td>35</td>
<td>20</td>
<td>25</td>
</tr>
</tbody>
</table>

HCV genotype distribution in fifty-five HCV-positive Iraqi patients as illustrated in figure -1, HCV genotype 4 was the predominant genotype with frequency 19(34.5%) followed by genotype 1 included 1a was 17(30.9%) and 1b was 12(21.8%). The lowest frequency was found in Genotype 2 was 4(7.3%) and Genotype 3 was 3(5.5%).

![Figure 1: Illustrated the frequencies of the genotype in HCV-positive Iraqi patients.](image)
In addition, the distribution of HCV genotypes & sub-genotype in studied groups according to gender as shown in table 2. The more frequently observed genotype in males was genotype 4 with proportion 92.3% (12 out 35) in chronic HCV. There was predominance of Genotype 1a in females than in males with proportion in chronic HCV was 80.0% (8 out 35), followed by Genotype 1b was [male 5(62.5%) vs female 3(37.5%)] in chronic HCV group. Genotype 2 and 3 showed the lowest percentage rate in both genders. There was significant difference in genotype according to gender in chronic HCV patient was (P value = 0.014).

Table 2: Distribution of different HCV genotypes according to gender in the chronic HCV patients.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>CHC</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Ia</td>
<td></td>
<td>2</td>
<td>20.0</td>
</tr>
<tr>
<td>Ib</td>
<td></td>
<td>5</td>
<td>62.5</td>
</tr>
<tr>
<td>II</td>
<td></td>
<td>1</td>
<td>50.0</td>
</tr>
<tr>
<td>III</td>
<td></td>
<td>1</td>
<td>50.0</td>
</tr>
<tr>
<td>IV</td>
<td></td>
<td>12</td>
<td>92.3</td>
</tr>
<tr>
<td>P value</td>
<td></td>
<td>0.014*</td>
<td></td>
</tr>
</tbody>
</table>

Analysis of mean fold change in expression level of miRNA-122 in patients’ plasma in comparison to the healthy control group showed that miRNA-122 displayed significant fold decrease in expression in (LC&HCC) group (2.708±3.922) and significant fold increasing in expression level in chronic HCV group (19.654±23.458) while, in control group was (3.421±4.093). Table (3) showed highly statistically significant differences in the mean values of miRNA-122 in plasma between the studied groups (P value =0.0001) and also observed highly significant fold change in miRNA-122 expression was found between either (CHC vs control) groups or (CHC vs LC&HCC) groups. Moreover, Non-significant fold change in miRNA-122 expression was found between (LC & HCC vs control groups).

Table 3: MiRNA-122 plasma levels in studied groups.

<table>
<thead>
<tr>
<th>MiRNA-122</th>
<th>CHC</th>
<th>(LC &amp;HCC)</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>19.654±23.458</td>
<td>2.708±3.922</td>
<td>3.421±4.093</td>
</tr>
<tr>
<td>Standard Error of Mean</td>
<td>3.965</td>
<td>0.877</td>
<td>0.819</td>
</tr>
<tr>
<td>Median</td>
<td>7.24</td>
<td>0.92</td>
<td>1.32</td>
</tr>
</tbody>
</table>

Discussion

The sex of population in present study was shown that the highest percentages of the studied groups were males. The p-values of the differences among the ages and genders of these groups were (0.061, 0.798) respectively. These differences were non-significant at P>0.05. The result of this study appeared an agreement with studies done in different Iraqi provinces as AL-Qadisiya and Thi-Qar that observed HCV infections in males was higher than females through epidemiological studies done before (6, 7). The results also agree with Al Zayed, who found that there was non-significant difference demonstrated for gender (8). But our findings contradict from that of Abdul Hasan who found equal sex ratio 1:1 (9). This high frequency of infection with HCV among males may be attributed to socio-community nature of Iraqi people which make men undergone the responsibility of working and eventually are in great contact with the pathogens rather than the women.

Furthermore, the difference between age groups was failed to reach the levels of statistical significance (P=0.05). However, the observation of present study agrees with previous studies that showed peak prevalence of anti HCV Abs were observed among persons more than 30 years to 49 years (10,11). Also, Similar results were reported by Ezzat et al. This is explained by the fact that this group of age has exposed to more accidents,
occupational risks, blood transfusion, surgeries, than younger groups of patients (12). Moreover, El–Garem et al. who found that there was a significant difference between the diseased groups as regards age \((P < 0.001)\) (13). In current study observed that HCV genotype 4 is the predominant genotype followed by 1a and 1b. In a study conducted in the south of Iraq, it was found that 35.0% of the samples typed as genotype 4 while 50.0% of the recruited samples typed as genotype 1(14). Genotype 4 has been linked with increased incidence of cirrhosis and poor response to interferon therapy (15,16). The results of the current study are divergent from most of other studies done, as that HCV genotype 1 was more found in females while HCV genotype 4 more observed in males. The result of this study agreement with Abdul Hasan., who found that genotype 4 was the dominant in HCV infected male while in female genotype 1a was the common one (9). In a study done by Zainab et al who found that HCV subtype 1a distributed in male 16% vs 4% in female, 1b distributed in male 6% vs 4% in female (17). In contrast, to our observation, in Libya, the prevalence of HCV genotype 1 was found to be significantly associated with males while genotype 4 was seen frequently in females (18). miRNAs are being investigated in HCV infection, with the most popular one being miRNA–122, which is the most abundant miRNA in the liver where it has many important biological roles. miRNA–122 was found to interact with HCV–RNA, thus enhancing its replication (19). Data obtained in this study showed that the mean fold changes in expression level of miR-122 significant fold increase in expression level in chronic hepatitis C group and significant fold decrease in expression in (LC&HCC). Our result was in agreement with the several studies conducted by El–Garem et al, who found that analysis of fold changes expression level of miRNA-122 displayed significant fold increase in expression level in chronic hepatitis C group and significant fold decrease in expression in cirrhotic patients in comparison to normal controls (13) and also, Waidmann et al. who reported that sera from patients with HCV contained higher levels of miRNA–122 compared with sera from healthy controls(20). Matching, our results, Bihrer et al who reported that sera from patients with CHC contained higher levels of miRNA -122 than from healthy controls (21). In addition, Trebicka et al explained the low level of MicroRNA-122 in decompensated liver cirrhosis by noting that MicroRNA 122 is present abundantly in hepatocytes with much lower levels in circulation in healthy subjects. With hepatocyte injury miRNA-122 is released in circulation more readily and serum level rise. (22). The current study revealed a significant decrease in circulating miRNA–122 expression level in patients with (LC&HCC) as compared with the control group.

This finding is in agreement with that of El–Garem et al. showed that significant fold decrease was noticed in the expression level of miRNA–122 in cirrhotic patients, in comparison with normal controls (13). Moreover, Ladeiro and Zucman–Rossi had established a significant down expression of miRNA–122 in 28 HCC liver tissues (mixed etiologies other than HCV) in comparison with four healthy liver tissues using qRT–PCR. Differences in miR–122 expression in HCV versus non–HCV HCC likely reflect virus–specific mechanisms contributing to carcinogenesis (23). Köberle and colleagues reported that it was noticed microRNA-122 expression did not differ significantly between patients with HCC and liver cirrhosis (24). Moreover, Ezzat et al. and Enas et al mentioned Patients with HCC showed non-significant higher expression level of miRNA-122 as compared to cases with cirrhosis (12,25).

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


10. Abbas A.H., Relationship of vitamin D with α-fetoprotein, IL-17 and INF I-γ in chronic hepatitis patients. Master. Theses, Middle Technical University College of Health & Medical Technology / Baghdad. 2017.


22. Trebicka, J., Anadol, E., Elfinova, N., Strack, I., Roggendorf, M., Viazov, S., Wedemeyer, I., Drebber,


Albumin Gradient and Sex Selection in Couples with Normal Seminal Fluid Parameters

Sumeya Ghanawy AL-Najjar

College of Medicine, Dhi-Qar University, Iraq

Abstract

Sex selection is an important concern for some couples. One of the relatively more simple and inexpensive methods, which does not need to use toxic chemicals to separate the Y and X sperms, is the albumin gradient method.

The aim of this study is to evaluate the results of sex selection in normozoospermic males by using the albumin gradient method.

The present study conducted on 90 couples with normozoospermic males. After the induction of ovulation and a vaginal sonography, sperm samples were prepared using the albumin gradient method, after which intrauterine insemination (IUI) was conducted. The rate of successful sex selection was then calculated.

Among 90 cases of performed IUI, 30 cases (33%) were successful, among which 3 cases (10%) suffered miscarriages and 27 cases (90%) were associated with a successful pregnancy. In general, the sex selection success rate was higher for the male gender; 19 cases with male and 8 cases with female.

Albumin gradient is an appropriate sex determination method in IUI cycles.

Keywords: Insemination, Sex selection, Albumin gradient

Introduction

Sex selection is the attempt to control the sex of the offspring to achieve a desired sex (1). In the long history of human reproduction, gender selection to seek a child of a preferred sex has persistently attracted parental interest. The desire for gender selection is a reflection of culture, tradition, religion, civilization, education and medical technologies in a given society or community, all of which may influence morality and mentality of the people living there (2).

Two major types of pre-implantation methods can be used for social gender selection. The Ericsson method, The Ericsson method separates male and female sperm by passing them through a column filled with blood protein, human serum albumin. As the sperm enter the human serum albumin, the differences in mass between the X and Y chromosomes manifest as the lighter male sperm push deeper into the protein than the females dragged down by the weight of the extra “leg” of the X sex chromosome (3) and In vitro fertilization (IVF)/preimplantation genetic diagnosis (PGD) technique (4) in which, the embryos of the desired gender are implanted back in the mother’s uterus.

In vitro sperm activation was designed to mimic an in vivo processes for separation spermatozoa from seminal plasma and selection the normal and highly motile spermatozoa (5). Semen processing methods are also designed to enhance sperm function and increase the chances of conception (6).

Swim down technique relies on the natural movement of spermatozoa to serum albumin medium.(12)

The increase in progressive motility as sperm moved down an albumin column has been observed in Y sperm, this useful in sex selection (8). Since Y bearing spermatozoa are smaller in size and have high motility

Corresponding author
Sumeya Ghanawy AL-Najjar
E-mail: dr.sumeya_inf@yahoo.com
they exhibit a greater downward swimming velocity than X chromosome bearing spermatozoa.

Nearly all the couples wanted boys, and in fact all those who became pregnant wanted boys. Hence, only male selection is considered in this paper.

**Materials and Method**

The study was carried out at infertility unit in Nassirya city and outpatient clinic. From February 2014 to July 2017.

This study involved 90 couples, both fertile and infertile couples (secondary infertility) seeking for gender selection, female factor. Female patient with bilateral tubal blockage that diagnosed by HSG (hysterosalpingography) were excluded. Males with normal seminal fluid parameters was involved. Patients that eligible for IVF were not included in this study. Regarding male, SFA was examined according to WHO 2010.

**Seminal Fluid Analysis**

The specimens were placed in an incubator at 37°C for 30 minutes to allow liquefaction. The liquefied semen is then carefully mixed for few seconds, and then the specimen was examined by macroscopic and microscopic examinations. The standard form of (WHO 2010) is used to record the results of seminal fluid analysis (Table 1).

**Table 1: Normal values of semen variables (WHO, 2010)**

<table>
<thead>
<tr>
<th>Sperm parameters</th>
<th>WHO Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sperm concentration millions/mL</td>
<td>15x10⁶ spermatozoa/mL or more</td>
</tr>
<tr>
<td>Total sperm motility (%)</td>
<td>&gt;40%</td>
</tr>
<tr>
<td>Sperm Grade Activity</td>
<td></td>
</tr>
<tr>
<td>Progressive motility (%)</td>
<td>&gt;32%</td>
</tr>
<tr>
<td>Non Progressive motility (%)</td>
<td></td>
</tr>
<tr>
<td>Immotile sperm (%)</td>
<td></td>
</tr>
<tr>
<td>Normal sperm morphology (%)</td>
<td>&gt;30%*</td>
</tr>
</tbody>
</table>

*WHO (1999) (42)

**Ovarian hyperstimulation**

Ovarian hyperstimulation was carried out with Clomiphine citrate (CC). CC was given in a dose of 50-100 mg early from day 2 to the 6th of the menstrual cycle alone or in combination with Gonadotrophins (gonal® 75 IU) in a dose of 75-150 IU/day starting from cycle day 2.

The follow up was done by Vaginal ultra-sound to monitor number and size of the ovarian follicles and the endometrial thickness. When size of the follicles reaches 17-18 mm, supplemented by subcutaneous injection of the ovulatory hormone Ovitrelle hCG 250 µg, 6500 IU to induce ovulation (11,12) then insemination performed by (IUI) catheter after 34-36 hr (13).

**Sperm Preparation by the Ericsson Albumin Method**

The Ericsson method is based on the assumption that Y-sperm swim faster than X-sperm. Sperm are placed in a test tube atop a “column” of increasingly thicker layers of albumin, and allowed to swim down into the solution. After a certain time period has elapsed, only the fastest sperm should have been able to penetrate to the bottom layer. Here is the procedure as described by Dr. Scott Ericsson. (14)
Intrauterine insemination technique

Intrauterine insemination technique (IUI) was performed by a special intrauterine catheter (GYNÉTICS ® Gynétic Medical Products N.V., Rembert Dodoens straat 51, Lommel-Belgium) attached with 2 ml syringe. Insemination volumes ranged from 0.5-1.0 ml of activated sperm sample.

Luteal phase support started from next day after insemination for two weeks by giving the patient progesterone tablets (duphstone ® 10 mg twice daily). Estimation of Beta human chorionic gonadotropins (B-hCG) was carried out on day 14 after IUI for pregnancy confirmation. Findings were confirmed by ultrasonography at later stages. If pregnancy was confirmed, luteal phase support with progesterone was continued till 12 weeks of gestation, while progesterone was withdrawn on a negative test report. The sex of the fetus determined by ultrasound at 16th week.

Results

Ninety couples were involved in this study. From table (2) significant decline (P < 0.05) was observed in the sperm concentration between pre- and post- in vitro sperm activation using albumin gradient.

Significant increment (P < 0.05) was noticed in the sperm motility (%) between pre- and post- activation. The results of progressive sperm motility (%) showed significant increase (P < 0.05) between pre- and post-activation.

Significant increase (P < 0.05) was assessed in the normal sperm morphology (%) between pre- and post-activation. In regard to the result of sperm agglutination (%), significant decline (P < 0.05) was observed in post- in vitro sperm activation. Significant decrement (P < 0.05) was observed in round cells count (HPF) between pre- and post-activation.

Table 2: Sperm parameters for males pre- and post- in vitro sperm activation.

<table>
<thead>
<tr>
<th>Sperm parameters</th>
<th>Pre activation</th>
<th>Post activation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sperm concentration (millions/mL)</td>
<td>65.75 ±1.85</td>
<td>30.35 b ±1.30</td>
</tr>
<tr>
<td>Progressive sperm motility (%)</td>
<td>40.15 ±1.45</td>
<td>85.70 b ±1.05</td>
</tr>
<tr>
<td>Non Progressive sperm motility (%)</td>
<td>30.60 ±2.00</td>
<td>5.01 b ±1.15</td>
</tr>
<tr>
<td>Immotile sperm (%)</td>
<td>75.73 ±1.68</td>
<td>40.78 ±1.29</td>
</tr>
<tr>
<td>Normal sperm morphology (%)</td>
<td>40.78 ±1.29</td>
<td>75.73 b ±1.68</td>
</tr>
<tr>
<td>Sperm agglutination (%)</td>
<td>3.66 ±0.694</td>
<td>0.00 b ±0.00</td>
</tr>
<tr>
<td>Round cells count (HPF)</td>
<td>3.00 ±0.365</td>
<td>0.00 b ±0.00</td>
</tr>
</tbody>
</table>

Notes:* Different letters: Significant difference (P<0.05) between groups  
* Data are mean ± S.E

Figure (1) show the rate of pregnancy following IUI of 90 women involved in this study. There were thirty out of ninety women become pregnant (33%) and the sixty women did not get pregnant (67%). The statistical analysis found a significant difference (P < 0.05) between them. Three pregnancies end with abortion.
The male babies was nineteen and the percentage of male sex selection was (70%), only eight female babies delivered which give (30%) percentage (figure 2). The statistical analysis found a significant difference ($P < 0.05$).

Discussion

The present study showed that in vitro sperm activation causes significant ($P < 0.05$) reduction in sperm concentration as compared to pre-activation. It has been shown that the swim down technology lead to marked reduction of the available sperm (15).

Also, this study explained a significant reduction ($P < 0.05$) in agglutination (%). Furthermore, post activation resulted in a significant ($P < 0.05$) reduction in the count of round cells and a significant increment ($P < 0.05$) in the percentage of normal sperm morphology, this is because the sperm preparation techniques for ART have been developed to remove the undesired sperm, round cells, debris, and thereby increase the overall sperm quality (16) (17).

The present study proved that there was significant increase ($P < 0.05$) in the percentages of progressive sperm motility. This is regarded as normal response for sperm activity after removal of seminal plasma since it contain dead sperm, leukocytes, epithelial cells, particulate debris and microbial contamination that produce many oxygen radicals that can negatively influence the sperm functions (18). In addition to that seminal plasma contain factors that inhibit induction of capacitation (19), (20), (21).

Furthermore, inclusion of protein source like albumin or human serum albumin in the medium is important for sperm viability and activity (22).

Human Serum Albumin (HSA), a sticky protein solution so that concentrate healthy, motile sperms, filter out abnormal and immotile sperms cells and debris, such as dead sperms cells and bacteria that may impede fertilization and appears to select population of sperms with normal morphology and high motility (23).

The presence of serum appears to facilitate the process of capacitation and/or the acrosome reaction of sperm, which is essential to enable them to fertilize an oocyte in vitro (24), (25). Serum in culture also appears to reduce the incidence of DNA damage in sperm and increase the rate of cleavage in human embryos (26).

Albumin is thought to function by stabilizing cell membranes and so to prevent the leakage of endogenous amino acid (27).

In addition to that, using human serum albumin for sperm preparation will enrich the medium with high amount of adenine monophosphate, which enhance sperm motility by fueling its energy and increase the number of highly active motile sperms (28).

On the other hand, when the separated spermatozoa have been examined for Y and X bearing spermatozoa, results have varied, some claiming success (29), (30), (31) and others denying it (32), (33).

Lighter sperms (Y sperm) in the albumin gradient technique produces much faster cross-human albumin layers than X sperms (HAS) and are deposited in test tubes (34). Researchers believe that the albumin gradient technique is a good method because it does...
not use chemicals to separate sperms and the fetus is not manipulated. On the other hand, many researchers including (35) (34) (36) confirmed the effectiveness of this method, especially in determining the male gender. Meanwhile, other researchers believed that this method was ineffective (35) (37).

The results presented here confirm the result done in Hong Kong for sex selection for boys (38). The results of the present was similar to the results obtained by Al-Dujaily and Al-Dahan (39). And study done in Omid Persian Gulf Infertility Center of Bushehr, Iran (40). These results obtained match the results obtained by Dr. Ericsson method for sex selection (14).

Conclusions

The albumin gradient is an appropriate, affordable sex determination method with few side effects in IUI cycles. This is due to a 33 % chance of pregnancy in infertile women and the probability of success of 70 % in sex determination.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References
24. Dow MP and Bavister BD. Direct contact is required between serum albumin and hamster spermatozoa for capacitation in vitro Gamete Res.1989; 23(2): 171-180
The Effect Insulin Therapy and Metformin on Osteoporosis in Diabetic Post-Menopausal Iraqi Women

Ali B. Roomi¹, Raid M. H. AL-Salih², Saher. A. Ali²
¹College of Health and Medical Technology, University of Al-Ayen, Iraq, ²Chemistry Department, College of Science, University of Thi-Qar, Iraq

Abstract

The aim of this study is to evaluate the effects of insulin therapy and metformin on osteoporosis (OP) in diabetic post-menopausal women. In this study, 200 individuals, aged (50-73) year. Control and patients were divided to four groups, each group containing 50 patients. Group (CG) were healthy post-menopausal, group (OP) were post-menopausal with OP, group (T2D insulin) were post-menopausal with diabetic and treated insulin once daily and group (T2D-metformin) were post-menopausal with diabetic and treated metformin (500 mg) twice daily. The results revealed that fasting blood glucose (F.B.G), hemostatic model assessment-insulin resistance (HOMO-IR), and bone mineral density (BMD) demonstrated a significant different in (T2D-insulin and T2D-metformin) group comparison with (OP) group. Serum insulin demonstrated a significant increase in (T2D-insulin) group comparison with (OP) group, while a significant reduce in (T2D-metformin) group comparison with (OP) group. Whereas, the osteocalcin (OC) and carboxy-terminal telopeptides of type I collagen (CTXI) was a significant reduce in (T2D-insulin and T2D-metformin) group comparison with (OP) group. The final concluded that insulin therapy increases bone turnover biomarkers more than metformin therapy.

Keywords: Bone mineral density, Osteoporosis, Post-menopausal, Insulin therapy, Metformin

Introduction

Osteoporosis (OP) is a highly prevalent disorder affecting 50 million individuals around the world[1]. It is also a typical skeletal disorder describe by low bone mass, which leads to reduced bone strength and an enhanced risk of fractures [2]. Bone loss occurs in post-menopausal OP as a result of an increase in the rate of bone remodeling and an imbalance between the activity of osteoclasts and osteoblasts [3]. T2D and OP are common metabolic disorders that belong to the most important causes of mortality and morbidity in the elderly population. It has become apparent that subjects with T2D are at higher risk of fracture[4], some the evidence suggested that T2D patients present generally normal or increased BMD [5]. Numerous studies in the previous years have identified additional advantages of metformin therapy, such as improving bone quality among the DM population and lowering fracture risk [6]. Insulin signaling regulates both bone resorption by osteoclasts and bone formation by osteoblasts. The clinical studies suggested that a positive association between BMD and insulin in T2D [7]. In other studies, concentrations of insulin showed rise osteoblast proliferation rate, collagen synthesis, glucose uptake, ALP production, and to inhibit osteoclast activity [8]. Interestingly, the relationship between fasting plasma insulin levels and whole-body BMD differed by the degree of IR, is positively correlated with BMD in the lowest of HOMA-IR, and inversely related with BMD as IR improved [9].

Materials and Method

This study has been conducted at Centre of Diabetes and Endocrine and AL-Hussein Teaching Hospital in Thi-Qar government in Iraq. Samples were collected in January 2018- September 2018. The target population of study were 200 post-menopausal. There was treated with oral anti-hyperglycaemic medications (metformin...
therapy) and insulin therapy for 3 years. Estimation of serum insulin, OC and CTXI by ELISA. Serum F.B.G estimated by copper kit (Randox, England).

Calculate HOMO-RI

The concentration of HOMO-IR calculated as follow\[10\].

\[
\text{HOMO-IR} = \frac{\text{Glucose (mmol/L)} \times \text{Insulin (µIU/mL)}}{22.5}
\]

Estimation of BMD

All individuals examined by DEXA (Osteosys Co., Ltd., Korea).

Statistical Analysis

By Statistical Package Social Sciences version 20 software (SPSS v.20).

Results and Discussion

Body Mass Index (BIM)

Table (1) showed a significant reduce for BMI in (OP) group comparison to (CG) group. There was non-significant increase in (T2D-insulin) group comparison with (OP) group. While non-significant decrease in (T2D-metformin) group comparison with (OP) group. So, BMI demonstrated non-significant reduce in (T2D-insulin) group comparison with (CG) group. While a significant decrease in (T2D-metformin) group comparison with (CG) group. Our results are in matched with results of other studies, which have shown that insulin was significantly higher in patients of post-menopausal with T2D compared with control and post-menopausal with OP group \[11\]. Various investigations have discovered endogenous insulin to have an anabolic impact on the bone \[5\], other examination found that exogenous insulin treatment eliminates the effect of endogenous insulin \[15\]. Col et al (2012) \[15\] have also discovered that insulin will inhibit C-peptide secretion which prompts to a negative effect on bone.

Table 1: Demonstrates BMI, for control and patient groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>NO.</th>
<th>BMI (Kg/m²) mean± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>50</td>
<td>29.55 ± 5.12</td>
</tr>
<tr>
<td>OP</td>
<td>50</td>
<td>25.98 ± 3.60 a</td>
</tr>
<tr>
<td>T2D-insulin</td>
<td>50</td>
<td>28.74 ± 4.33 ab</td>
</tr>
<tr>
<td>T2D-metformin</td>
<td>50</td>
<td>27.42 ± 2.88 b</td>
</tr>
<tr>
<td>LSD</td>
<td></td>
<td>1.33</td>
</tr>
</tbody>
</table>

Serum Insulin

The table (2) demonstrated a significant increase for fasting serum insulin in (OP) group comparison with (CG) group. So, the insulin demonstrated a significant increase in (T2D-insulin) group comparison with (OP) group, but there was a significant reduce in (T2D-metformin) group comparison with (OP) group. On the other hand, the insulin was a significant increase can observed in (T2D-insulin) group comparison with (CG) group, but there was no significant reduce in (T2D-metformin) group comparison with (CG) group. These results agree with the other studies, which have shown that insulin was significantly higher in patients of post-menopausal with T2D compared with control and post-menopausal with OP group \[14\]. Various investigations have discovered endogenous insulin to have an anabolic impact on the bone \[5\], other examination found that exogenous insulin treatment eliminates the effect of endogenous insulin \[15\]. Col et al (2012) \[15\] have also discovered that insulin will inhibit C-peptide secretion which prompts to a negative effect on bone.

Table 2: demonstrates serum insulin, for control and patient groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>NO.</th>
<th>Insulin (µIU/mL) mean± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>50</td>
<td>8.33 ± 2.40 c</td>
</tr>
<tr>
<td>OP</td>
<td>50</td>
<td>10.45 ± 1.55 b</td>
</tr>
<tr>
<td>T2D-insulin</td>
<td>50</td>
<td>15.42 ± 1.01 a</td>
</tr>
<tr>
<td>T2D-metformin</td>
<td>50</td>
<td>8.51 ± 2.49 c</td>
</tr>
<tr>
<td>LSD</td>
<td></td>
<td>0.64</td>
</tr>
</tbody>
</table>

Fasting Blood Glucose (F.B.G)

The table (3) demonstrated a significant increase for F.B.G (OP) group comparison with (CG) group. At the same time, the F.B.G demonstrated non-significant increase in (T2D-insulin) group comparison with (OP) group, but there was a significant increase in (T2D-metformin) group comparison with (OP) group. While, there significant increase can observed between (T2D-insulin and T2D-metformin) groups compared with (CG) group. These results agree with the other studies, which have shown that evaluated the glycemic state of the DM by measuring F.B.G \[16\]. Blood glucose was decreased...
significantly by metformin therapy in the treated patients but it did not reach a normal [17]. Metformin therapy requires other hypoglycemic medications in combination therapy to improve glycemic control and reduce [18]. Hyperglycemia has been found to reduce bone density by decreasing number and osteoblast function, bone mineralization and constraining osteoblast maturation, reducing the response to 1,25 (OH) Vitamin D3, and inducing glycation of different proteins and glycation end products (AGEs) [19, 20]. Accumulation of AGEs can impact the rigidity of the bone but do not appear to impact mineralization [21].

Table 3: Demonstrates serum F.B.G, for control and patient groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>NO.</th>
<th>F.B.G (mmol/L) mean± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>50</td>
<td>4.44 ± 0.95 c</td>
</tr>
<tr>
<td>OP</td>
<td>50</td>
<td>4.92 ± 0.85 b</td>
</tr>
<tr>
<td>T2D-insulin</td>
<td>50</td>
<td>5.01 ± 0.82 b</td>
</tr>
<tr>
<td>T2D-metformin</td>
<td>50</td>
<td>7.27 ± 1.40 b</td>
</tr>
<tr>
<td>LSD</td>
<td></td>
<td>0.34</td>
</tr>
</tbody>
</table>

Hemostatic model assessment-insulin resistance (HOMO-IR)

The table (4) showed that HOMO-IR (OP) group was significantly increased in the (CG) group. So, HOMO-IR demonstrated that highly significant in (T2D-insulin and T2D-metformin) groups comparison with (OP) group. While, the highly significant can observed between (T2D-insulin and T2D-metformin) groups compared with (CG) group. This results agree with the others study, which suggested that HOMA-IR were significant increase in patients of post-menopausal women with T2D compared with the controls and group post-menopausal with OP [14]. There is some evidence that HOMA-IR was highly significant in the T2D post-menopausal compared to the control group [22]. The HOMA-IR was highly significant in T2D-metformin group compared with the group CG, this came in line with those of previous research that supports the idea of greater improvement in insulin sensitivity reported in DM treated with metformin therapy [23].

Table 4: Demonstrates HOMO-IR, for control and patients groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>NO.</th>
<th>HOMO-IR (mmol/L × µIU/mL) mean± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>50</td>
<td>1.65 ± 0.64 d</td>
</tr>
<tr>
<td>OP</td>
<td>50</td>
<td>2.29 ± 0.56 c</td>
</tr>
<tr>
<td>T2D-insulin</td>
<td>50</td>
<td>3.44 ± 0.62 a</td>
</tr>
<tr>
<td>T2D-metformin</td>
<td>50</td>
<td>2.73 ± 0.87 b</td>
</tr>
<tr>
<td>LSD</td>
<td></td>
<td>0.22</td>
</tr>
</tbody>
</table>

Bone Mineral Density (BMD)

Table (5) showed BMD demonstrated a significant reduce in (OP) group comparison with (CG) group. So, BMD demonstrated the significant increase in (T2D-insulin and T2D-metformin) groups comparison with (OP) group. While, the significant increase can observed between (T2D-insulin and T2D-metformin) groups compared with (CG) group. There are conflicting studies reporting an increase, decrease, or no change in BMD in T2D patients when compared with healthy post-menopausal [23]. These results are partly in agreement with the result of Christensen and Svendsen, 1999 [24] who stated that post-menopausal IDDM had lower BMD than NIDDM. Post-menopausal IDDM have a moderately reduced BMD, while NIDDM patients seem to be moderately protected from post-menopausal bone loss. Nevertheless, our results only support to some degree the hypothesis of general osteopenia in IDDM patients. Post-menopausal women with OP have a significantly lower BMD as compared with healthy post-menopausal [25]. Other study found that exogenous insulin increased BMD [26], by some, whereas others have found no impact on bone [27], and other studies establish that insulin therapy reduced bone loss or improved rate of fracture [28].
Table 5: Demonstrates BMD, for control and patient groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>NO.</th>
<th>BMD (g/cm²) mean± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>50</td>
<td>1.01 ± 0.07 a</td>
</tr>
<tr>
<td>OP</td>
<td>50</td>
<td>0.67 ± 0.09 b</td>
</tr>
<tr>
<td>T2D-insulin</td>
<td>50</td>
<td>0.74 ± 0.08 c</td>
</tr>
<tr>
<td>T2D-metformin</td>
<td>50</td>
<td>0.84 ± 0.07 d</td>
</tr>
<tr>
<td>LSD</td>
<td></td>
<td>0.02</td>
</tr>
</tbody>
</table>

Serum Osteocalcin (OC)

The table (6) showed OC value of (OP) group was significantly increased in (CG) group. So, OC demonstrated a significant reduce in (T2D-insulin and T2D-metformin) groups in comparison with (OP) group. While, the significant reduce can observed between (T2D-insulin and T2D-metformin) groups compared with (CG) group. There are conflicting studies on the impact of insulin therapy on bone biomarker (bone formation) reporting an increase, decrease, no change or not report in T2D patients. [6; 29]. While other studies indicated that, the impact of metformin on bone biomarker (bone formation) is neutral or decrease [6]. Serum OC was established to be significantly higher in post-menopausal with OP than that in the healthy post-menopausal. These results are partly in agreement with [30], they found a significant increase in serum OC were obtained in groups of post-menopausal with OP as compared to healthy post-menopausal. Serum OC was significantly lower in post-menopausal NIDDM compared with post-menopausal IDDM and reference values [24].

Table 6: Demonstrates serum OC, for control and patient groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>NO.</th>
<th>OC (ng/mL) mean± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>CG</td>
<td>50</td>
<td>20.42 ± 2.68 b</td>
</tr>
<tr>
<td>OP</td>
<td>50</td>
<td>31.60 ± 3.01 a</td>
</tr>
<tr>
<td>T2D-insulin</td>
<td>50</td>
<td>16.36 ± 2.60 c</td>
</tr>
<tr>
<td>T2D-metformin</td>
<td>50</td>
<td>14.44 ± 1.55 d</td>
</tr>
<tr>
<td>LSD</td>
<td></td>
<td>0.83</td>
</tr>
</tbody>
</table>

Serum Carboxyl-Terminal Telopeptide of Type I Collagen (CTXI)

A significant increase for CTXI in (OP) group comparison with (CG) group. So, CTXI value demonstrated a significant reduce in (T2D-insulin and T2D-metformin) groups comparison with (OP) group. While, there a significant increase can observed between (T2D-insulin and T2D-metformin) groups compared with (CG) group. These results are partly in agreement with other studies which in post-menopausal NIDDM markers both of bone formation and bone resorption were significantly lower than in the post-menopausal IDDM (though no-significantly for bone resorption), also lower than reference values from healthy post-menopausal [24].

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


Effect of Laser Diode and *Camellia Sinensis* Extract on Some Blood Parameters of Male Laboratory Rats Infected with Arthritis

Wafaa Abdulmutalib Naji\(^1\), Alaa J. Mohammed\(^2\), Mohammed Qasim Waheeb\(^1\)

\(^1\)Department of Biology, \(^2\)Department of Physics, College of Science, AL-Muthanna University, AL-Muthanna, Iraq

**Abstract**

The objective of this study is to investigate the effect of Green tea extracts (GTE) and Low Level Laser Therapy (L.L.L.T.) on healing of feet arthritis. Elevated free radical generation in inflamed joints and impaired antioxidant system has been implicated in arthritis. The medicinal effects of tea have a history dating back almost 5000 years. The chemical components of green tea chiefly include polyphenols, caffeine and amino acids. Tea also contains flavonoids, compounds reported to have antioxidant properties having many beneficial effects. Tea flavonoids reduce inflammation, have antimicrobial effects. Laser Therapy is active at both the cellular and systemic levels activating a variety of mechanisms including cartilage regeneration, DNA synthesis, improved microcirculation and an analgesic and anti-inflammatory effect. This study included twenty four adult male rats; the arthritis induced in all animals by using the formaldehyde then was divided into four groups (6 rats each) G1 control group, G2 treated with Low Level Laser Therapy LLLT, G3 treated with GTE and G4 treated with LLLT and GTE in physiology laboratory.

This study investigates possible mechanisms by which laser and GTE protect joints in rat model by the blood parameters studying in Experimentally Infected laboratory Rats with Arthritis.

**Keywords:** LASER; *Camellia sinensis*; Blood; Male Rates.

**Introduction**

Arthritis results in the deterioration of the joint through the process of chronic inflammation. The most common form is degenerative osteoarthritis, Osteoarthritis most commonly affects the hands, feet, spine and the large weight bearing joints such as the hips and knees \(^1\).

Although many medicines are prescribed for the treatment of arthritis, they are known to produce various side effects including gastrointestinal disorders, immunodeficiency and humoral disturbances. So, there is still a need to seek therapeutic agents with lower side effects that can be used for long-term administration \(^2\).

The chemical components of tea leaves include polyphenols (catechins and flavonoides), alkaloids (caffeine, theobromine, theophylline, etc.), volatile oils, polysaccharides, amino acids, lipids, vitamins (e.g., vitamin C), inorganic elements (e.g., aluminium, fluorine and manganese), etc. However, the polyphenols are primarily responsible for the beneficial healthful properties of tea. The flavonoides have antioxidant, anti-inflammatory, antiallergic and anti-microbial effects \(^3\).

Low level lasers are thought to promote healing and reduce pain possibly through the reduction of inflammation. Healing may come about by increased cell proliferation, Treatment of arthritis is very complex, and in the past years, some studies have investigated the

**Corresponding author:**
Mohammed Qasim Waheeb  
E-mail: mqassim59@yahoo.com
use of low-level laser therapy (LLLT) in treatment of it [4,5].

The aim of study is assessed the effects of L.L.L.T and GTE on the changing of the levels of some blood parameters in the rats with adjuvant-induced arthritis (AIA) as a model for arthritis.

**Materials and Method**

**Animals**

Twenty four male adult white rats, named scientifically as *Rattus norvegicus*, with six to nine month aged and average weight of (350-400g.), were used in this study. They were kept in standard separate cages and had free access to tap water and were fed with standard pellets *ad libitum*. This model was selected because it provides many desired characteristics to fulfill the requirements of this study. All cages were kept in conditioned room 20-22˚C with controlled lightening. The animals left for two week before the experiment for adaptation.

**Extraction Procedure**

The leaves of tea (*Camellia sinensis*) were powdered, then weighted (15 grams) of the powder and dissolved in 100 ml of 70% distilled water using a magnetic stirrer for 24 hours at room temperature (25˚C). The resultant extract solution was filtered using double layers of cotton gauze. The filtered solution was dried at 40˚C, after that we dissolved every 1 gram in 5 ml distilled water to produce the 200 mg/ml of extracting, the dosing began in the treated groups in the treatment days in fact between day and other from fourteenth day to twenty two day (and according to concentration sentences and took the average of animals weight as 300 mg) the amount of the dosing was 1.5 ml for each animal.

**Laser diode**

The laser system used was semiconductor crystal with active medium is Ga Al As (gallium aluminum arsenide).

The laser used was diode 820 nm wave length, a maximum output of 200 mW, density 8 J/cm², pulsing frequency 2.5-20 Hz. Irradiation began in the irradiation groups in the treatment days in fact between day and other from fourteenth day to twenty two day with 1.20 min /session daily. The Irradiation was carried out by 1 cm. from the skin of the paws edema.

**Induction of adjuvant-induced arthritis in rats**

For induction of experimental arthritis, the plantar surface of the left hind paw of rat was injected with 0.1 ml of (HCHO) and with 2 % concentration in the first and third days of experimentation [27]. The changes that have occurred in the foot (after the tenth day postoperation) which is redness, swelling and lameness, as observed there a significant increase (P <0.05) in the thickness of the foot in the fourteenth day (5.78 ± 0.62 mm) comparing with the first (4.01 ± 0.21 mm).

**Blood sampling**

Blood samples were collected under general anesthesia using a mixture of Ketamine hydrochloride (10 mg/Kg) and xylazine (3 mg/ Kg) administered i/m., at regular intervals from the heart after disinfection using 70% alcohol, in first, fourteenth, nineteenth, twenty three and twenty eight days post operation the amount of blood was 3 cc, and blood samples were collected using syringes 3 mL, then used complete blood system to measure Hb and RBC, WBC and platelets counts and used westergrene method for ESR levels and hematocrit centrifugation for PCV measurements.

**Statistical analysis of data**

The minitab statistical program was used to calculate the statistical significance of difference between groups. The difference between groups at the $P \leq 0.05$ levels was considered statistically significant.

**Results**

RBC counts, PLT count, HB levels, PCV value decreasing in the all groups after the inducing of the disease put in the treatment groups returns to the normal values after the treatment and with significant varies between these groups and control group, according to the (fig. 1),(fig. 2),(fig. 3), (fig.4) respectively.

WBC counts and ESR levels increasing in the all groups after the inducing of the disease put in the treatment groups returns to the normal values after the treatment and with significant varies between these groups and control group, according to the (fig.5), (fig.6) respectively.
Figure 1: RBC counts variations among the groups of rats during the experimentation time (inducing and treatment). There are significant variations between G1 & G2 at $P \leq 0.010$, between G1 & G3 at $P \leq 0.015$ and between G1 & G4 at $P \leq 0.014$.

Figure 2: PLT counts variations among the groups of rats during the experimentation time (inducing and treatment). There are significant variations between G1 & G2 at $P \leq 0.041$, between G1 & G3 at $P \leq 0.047$ and between G1 & G4 at $P \leq 0.038$.

Figure 3: HB Levels variations among the groups of rats during the experimentation time (inducing and treatment). There are significant variations between G1 & G2 at $P \leq 0.015$, between G1 & G3 at $P \leq 0.011$ and between G1 & G4 at $P \leq 0.006$.

Figure 4: PCV Levels variations among the groups of rats during the experimentation time (inducing and treatment). There are significant variations between G1 & G2 at $P \leq 0.019$, between G1 & G3 at $P \leq 0.01$ and between G1 & G4 at $P \leq 0.004$.

Figure 5: WBCs counts variations among the groups of rats during the experimentation time (inducing and treatment). There are significant variations between G1 & G2 at $P \leq 0.023$, between G1 & G3 at $P \leq 0.020$ and between G1 & G4 at $P \leq 0.042$.

Figure 6: ESR Levels variations among the groups of rats during the experimentation time (inducing and treatment). There are significant variations between G1 & G2 at $P \leq 0.051$, between G1 & G3 at $P \leq 0.053$ and between G1 & G4 at $P \leq 0.038$.

Discussion

Rheumatoid arthritis (RA) is an autoimmune disease that causes chronic inflammation of the joints and tissue around them with infiltration of macrophages and activated T cells. The pathogenesis of this disease is linked predominantly with the formation of free radicals at the site of inflammation and decreased...
Camellia sinensis. The most thrombocytopenia of the group of experimental in patients with rheumatoid arthritis (RA) due to anemia. 

With what indicated of red blood cell deposition and this result is consistent indicates anemia and a significant increase in the rate hemoglobin, red blood cells and blood mass, which with arthritis may be due to the low percentage of with the findings of the researcher explained anemia 

Reduced numbers of red blood cells in male laboratory rats with arthritis may be due to the increased level of inflammatory cytokines, especially IL-6, IL-1β, TNF-α, which inhibit the formation of progenitors of the pellets, as well as reduce the level of Erythropoietin. This is in line with the reference [9,10], or the decrease in the number of red blood cells may be due to an imbalance in the function of the thyroid gland and its hormones, which results from the effects of toxins generated in the body of the animal after the disease was introduced by formaldehyde, as hormones play a role in directing the metabolic process within the body as well as its indirect role in influencing the production of red blood cells in the bone marrow [11].

The decrease in the concentration of total hemoglobin of male laboratory rats infected with osteoarthritis may be due to the free radicals of ROS that lead to hemoglobin damage and formation of red blood cells. These deposits dissolve red blood cells, and free radicals attack the membranes of the pellets Red blood cells are broken and oxidized by the lipid forming of these membranes, or low levels of Erythropoietin and malnutrition are the main causes of hemoglobin deficiency, which leads to anemia [12]. These reasons were consistent with what the researchers explained [13,14].

The decrease in morbidity in the value of the blood mass is due to the reduction of red blood cells production and is mainly reflected on the value of the blood mass, which leads to a decline. The results of this study with the findings of the researcher [15]. Experimentally with arthritis may be due to the low percentage of hemoglobin, red blood cells and blood mass, which indicates anemia and a significant increase in the rate of red blood cell deposition and this result is consistent with what indicated [16], which explained the rise in ESR in patients with rheumatoid arthritis (RA) due to anemia. 

The significant increase in the number of thrombocytopenia of the group of experimental laboratory rats infected with arthritis may be due to the significant effect of one of the inflammatory cytokines (IL-6) in the immune response and regulation of the acute reaction stages of the infection [17]. There is also a significant effect of blood hemoglobin on blood platelet counts. The lower the hemoglobin level, the higher the platelet counts [18].

The increase in the total number of white blood cells in laboratory rats infected with osteoarthritis may be due to the condition of oxidative stress on animals, which leads to increased secretion of adrenal cortex stimulating hormone (ACTH) secreted from the pituitary gland, which stimulates the secretion of corticosteroids from Adrenal cortex and thus increase the number of white blood cells, which is the effects of the reaction of systemic inflammation within the body, as it involves the production of more white blood cells and monotonous nuclei that have a significant role in influencing the production of red blood cells in the bone marrow.

The antioxidant, anti-inflammatory, and antioncogenic properties of a polyphenolic mixture derived from green tea (Camellia sinensis). The most abundant of the polyphenolic compounds in green tea is epigallocatechin gallate (EGCG), with other catechins such as epicatechin (EC), epigallocatechin (EGC) and epicatechin gallate (ECG) also present [23].

The researcher [21] has been reported that laser photonic energy is absorbed by the mitochondria in the cell in which this energy is converted to chemical kinetic energy and finally leads to more production of ATP. ATP is the source of energy in the cell which is necessary for cell activities such as synthesis of DNA, RNA and proteins that are important in cellular proliferation [7,22].

The antioxidant, anti-inflammatory, and antioncogenic properties of a polyphenolic mixture derived from green tea can ameliorate inflammation in a murine model of inflammatory arthritis.

In studies using human chondrocytes derived from osteoarthritis cartilage, it had showed that EGCG is effective inhibitor of production of as nitric oxide (NO) and PGE2 by transcriptional and translational regulation [25]. Mohamadin and his colleagues found the supplementation of green tea extract (GTE) attenuates cyclosporine A-induced oxidative stress in rats [26]. Thus, there is experimental evidence to support further studies to investigate the anti-oxidative effects of green tea at
the molecular level.

Conclusion

The treating of the arthritis with GTE and L.L.L.T was useful and efficient that the healing was promoted and accelerated because its healing stages were induced by GTE and L.L.L.T.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


The Antibacterial Activity of Zinc Oxide Nanoparticles Against Isolates from Internal Cavity of Dental Implant and Natural Teeth (in Vitro Study)

Dhyaa M J Hirz Al-Deen, Basima GH Ali, Abbas Sabri Al-Mizraqchi
1Department of Periodontics, Master Student, College of Dentistry, University of Baghdad, Iraq, 2Department of Periodontics, 3Department of Basic Science, College of Dentistry, University of Baghdad, Iraq

Abstract

**Background:** Nanotechnology is a new science that has the ability to offer a wide range of uses and improved technologies for biological and biomedical applications. It is considered as the production, categorization, and exploration of materials in the nanometer. This study was aimed to demonstrate the effect of zinc oxide nanoparticles (ZnO NPs) on aerobic and anaerobic bacteria from internal cavity of the dental implants and sulcus of natural teeth in comparison with chlorhexidine 2% and solvent (water 3: 1 ethanol 99.9%).

**Materials and method:** Aerobic and anaerobic bacteria were isolated from sulcus of natural teeth and internal cavity of dental implants after 3 months from implant placement surgery (flapless design) to 6 female with age range 30 to 44 years with a total of sixteen implants. Different concentrations of ZnO-NPs (6, 2, 1, 0.5, 0.25, and 0.1mg/ml) were prepared. In this in vitro study, disk diffusion method was used to demonstrate the antibacterial activity of different concentrations of zinc oxide nanoparticles to isolated bacteria in comparison to 2% (positive control) and solvent (negative control).

**Results:** Aerobic and anaerobic bacterial isolates were sensitive to concentrations (6, 2, 1, 0.5, 0.25, and 0.1mg/ml) of zinc oxide nanoparticles in comparison with CHX and solvent. There was synergistic effect between CHX and 1mg/ml in all agar plates. All concentrations when compared with negative control showed highly significant differences.

**Conclusion:** This study shown that zinc oxide nanoparticles were effective against bacteria isolated from internal cavity of dental implant and sulcus of natural teeth.

**Keywords:** ZnO, Nanoparticles, Aerobic bacteria, Anaerobic bacteria, teeth implant.

Introduction

Dental plaques, also defined as oral biofilms, are defined as “matrix-enclosed bacterial populations adherent to each other and/or to surfaces or interfaces” [1]. The development of dental plaque is started by pellicle that formed on the surfaces of the tooth, initial colonizers of streptococcal species are attached to specific receptors have been provided by these pellicles [2]. During biofilm development, anaerobic changes occur in its environment from aerobic conditions. According to these changes bacterial colonizers of this biofilm also change toward gram negative bacteria while it was previously dominated by Gram-positive species [3]. This bacterial building change is indicative of transformation from health to diseased state of periodontium [4-10].

Prevention of early biofilm formation at the implant hole is important to prevent further bone loss at early stage. Deferent materials had been tested as CHX 1% and 2% concentrations [11]. Nanotechnology is a developing technology including production or application of nano-sized structures or materials [12]. Nanotechnology is considered as the production, categorization and exploration of materials in the nanometer. The materials that are relevant in this technology are those whose structures display new and significantly enhanced biological and physicochemical properties in addition to functionalities as an effect of the nano-scale size [13].

Corresponding author:
Dhyaa M J Hirz Al-Deen
e-mail: dhaajwad@gmail.com
The combination between nanotechnology and biotechnology, for emerging biosynthetic and ecological friendly technology for creation of nanomaterials, is called Bionanotechnology [14].

The material started to be used for different purposes, one of them is antibacterial action from their materials is Zinc oxide nanoparticles (ZnO-NPs). ZnO is described as a strategic, promising, functional and valuable white inorganic material with a wide range of applications. ZnO has a chemical sensing, unique optical, electric conductivity semiconducting, and piezoelectric properties [15-18].

Many mechanisms for the antibacterial actions of ZnO-NPs have been suggested including destruction of the bacterial cell wall and membrane integrity by direct contact with ZnO-NPs [19,20], generation of reactive oxygen species (ROS) like H$_2$O$_2$ [27,28] and release of Zn$^{2+}$ ions that have the ability to damage cell membrane and interact with intracellular organelles [21,22].

ZnO-NPs with smaller size (higher specific surface areas) displayed highest antibacterial activity [23].

This study was aimed to demonstrate the effect of zinc oxide nanoparticles (ZnO NPs) on aerobic and anaerobic bacteria from internal cavity of the dental implants and sulcus of natural teeth in comparison with chlorhexidine 2% and solvent (water 3:1 ethanol 99.9%).

**Materials and Method**

**Characterization and preparation of ZnO-NPs**

Zinc Oxide Nanoparticles (ZnO, 99.8%, 10-30nm) Skyspring USA. absorbance spectra of NPs stock solution were measured by UV-VIS spectrophotometer (Spectro UV-VIS Double beam UVD-3500). In the wavelength range 200nm-800nm

ZnO-NPs powder were identified by the Scanning Electron Microscope SEM (CM 10 Philips) and prepared by:

A. Solvent preparation distill water 3:1 ethanol 99.9% for preparation of ZnO-NPs concentration.

B. Zinc oxide nanoparticles (10-30nm) prepared by adding solvent (3:1, water: ethanol) [32] to make a stock solution.

**Patient selection**

Six females aged 30 to 44 years with a total of sixteen implants, the dental implants placement was part of their overall treatment plan.

**Surgical implant placement**

By using flapless technique only, the gingiva at the site of implant was removed by tissue puncher, the proposed dental implant (Roott®) site was exposed. Conventional drilling procedure was done in sequence until reaching the requested final drill dental implant that was inserted. Before placement of the healing abutment, all implant screw holes were rinsed with about 20ml of sterile saline solution by disposable syringe and dried using surgical suction, thus preventing further contamination.

**Bacterial samples collection and culture method**

After 3 months from implant placement, healing abutment removed and samples were collected by small sterile brush from implant internal hole of the fixture in Heart Infusion Broth (BHI-B) and from sulcus of natural teeth. Antimicrobial activities of the ZnO-NPs were performed against both aerobic and aerobic bacteria. The antibacterial activity was done by well-diffusion method, as follows:

0.1ml of activated aerobic and anaerobic isolates were spread in duplicate on Brain Heart Infusion agar plates and left at room temperature for 10 minutes, then eight wells made.

The wells were filled with ZnO-NPs in different concentrations (6, 2, 1, 0.5, 0.25 and 0.1mg/ml) and one well for chlorhexidine 2% as positive control and the last well for solvent (ethanol water mixture) as negative control.

Plates left in the room temperature for 10 minutes and then incubated aerobically for 24hr at 37°C for aerobic bacteria and for anaerobic bacterial plate, it was placed in gas pack and incubated also for 24hr at 37°C. The different diameters of inhibition zone were measured.

**Results**

**Characteristics of ZnO-NPs UV-VIS absorption spectra**
Figure (1) showed that the absorption spectrum exhibited a sharp absorbance onset at 337nm, which indicated that this absorption peak is considered as a hallmark of ZnO NPs at applied nanoparticles size (<40nm).

Figure (2) showed the SEM image of ZnO nanoparticles. The SEM image was taken at X 94,000 magnification. The size of the particles was around 19.4-34.7nm.

Scanning Electron Microscope (SEM)

Figure (2) showed the SEM image of ZnO nanoparticles. The SEM image was taken at X 94,000 magnification. The size of the particles was around 19.4-34.7nm.

Determination of antibacterial activity of Zinc oxide nanoparticles (agar well-diffusion method)

ZnO-NPs showed an increase in diameter of the inhibition zone as the concentration increased. The 6mg/ml concentration showed larger inhibition zone than chlorhexidine (positive control), while the solvent (negative control) showed no inhibition zone.

When comparing between inhibition zones of bacterial samples for implants and natural teeth for the same concentration and bacterial type, the results were not significantly different in all concentrations and bacterial type, except for the 6mg/ml concentration in aerobic bacteria as it showed significant difference (P= 0.029; Table 1).

For CHX no significant difference was found in the size of inhibition zone of bacterial samples between implants and natural teeth for aerobic and anaerobic bacteria. Also, for solvent (negative control) no inhibition zones for implant and natural teeth for aerobic and anaerobic bacteria were seen (Figure 3).
Table 1 Descriptive and statistical test of inhibition zone (mm) among sites by concentrations of tested material and bacterial type

<table>
<thead>
<tr>
<th>Conc (mg/ml)</th>
<th>bacterial type</th>
<th>sites</th>
<th>No.</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>t-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>7.50</td>
<td>9.00</td>
<td>8.13</td>
<td>.53</td>
<td>.13</td>
<td>1.166</td>
<td>.257</td>
</tr>
<tr>
<td>0.1</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>8.00</td>
<td>9.00</td>
<td>8.42</td>
<td>.49</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>7.00</td>
<td>9.00</td>
<td>7.66</td>
<td>.60</td>
<td>.15</td>
<td>.579</td>
<td>.569</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>7.00</td>
<td>8.00</td>
<td>7.50</td>
<td>.45</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>9.50</td>
<td>11.00</td>
<td>10.03</td>
<td>.46</td>
<td>.12</td>
<td>1.08</td>
<td>.295</td>
</tr>
<tr>
<td>0.25</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>10.00</td>
<td>10.50</td>
<td>10.25</td>
<td>.27</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>8.50</td>
<td>10.50</td>
<td>9.38</td>
<td>.53</td>
<td>.13</td>
<td>1.529</td>
<td>.142</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>8.50</td>
<td>9.50</td>
<td>9.00</td>
<td>.45</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>11.50</td>
<td>13.00</td>
<td>12.31</td>
<td>.54</td>
<td>.14</td>
<td>.751</td>
<td>.461</td>
</tr>
<tr>
<td>0.5</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>12.00</td>
<td>13.00</td>
<td>12.50</td>
<td>.45</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>10.50</td>
<td>12.50</td>
<td>11.38</td>
<td>.53</td>
<td>.13</td>
<td>1.901</td>
<td>.072</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>10.00</td>
<td>12.00</td>
<td>10.83</td>
<td>.75</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>14.00</td>
<td>16.00</td>
<td>15.00</td>
<td>.73</td>
<td>.18</td>
<td>.264</td>
<td>.795</td>
</tr>
<tr>
<td>1</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>14.50</td>
<td>15.50</td>
<td>14.92</td>
<td>.38</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>13.00</td>
<td>15.00</td>
<td>14.03</td>
<td>.53</td>
<td>.13</td>
<td>2.073</td>
<td>.051</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>13.00</td>
<td>14.00</td>
<td>13.50</td>
<td>.55</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>16.00</td>
<td>19.00</td>
<td>17.38</td>
<td>.89</td>
<td>.22</td>
<td>1.604</td>
<td>.124</td>
</tr>
<tr>
<td>2</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>17.00</td>
<td>18.50</td>
<td>18.00</td>
<td>.55</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>15.00</td>
<td>17.00</td>
<td>16.09</td>
<td>.55</td>
<td>.14</td>
<td>.892</td>
<td>.383</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>15.00</td>
<td>17.00</td>
<td>15.83</td>
<td>.75</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>21.00</td>
<td>23.50</td>
<td>22.19</td>
<td>.85</td>
<td>.21</td>
<td>2.353</td>
<td>.029</td>
</tr>
<tr>
<td>6</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>22.50</td>
<td>24.00</td>
<td>23.08</td>
<td>.58</td>
<td>.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>20.00</td>
<td>23.00</td>
<td>21.06</td>
<td>.75</td>
<td>.19</td>
<td>1.645</td>
<td>.116</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>21.00</td>
<td>23.00</td>
<td>21.67</td>
<td>.82</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>18.00</td>
<td>22.00</td>
<td>20.06</td>
<td>1.06</td>
<td>.27</td>
<td>.0128</td>
<td>.900</td>
</tr>
<tr>
<td>CHX</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>19.00</td>
<td>21.00</td>
<td>20.00</td>
<td>.89</td>
<td>.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>18.00</td>
<td>22.00</td>
<td>19.88</td>
<td>1.09</td>
<td>.27</td>
<td>1.283</td>
<td>.214</td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td>6</td>
<td>18.00</td>
<td>21.00</td>
<td>19.17</td>
<td>1.33</td>
<td>.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aerobe</td>
<td>Implant</td>
<td>16</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solvent</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anaerobe</td>
<td>Implant</td>
<td></td>
<td>16</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solvent</td>
<td>Natural</td>
<td></td>
<td>6</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 3 Anti-bacterial activity for different concentrations of ZnO-NPs with positive control, CHX, and negative control, solvent.

All concentrations (0.25, 0.5, 1, 2 and 6mg/ml) showed highly significant statistical differences between aerobic and anaerobic bacterial isolates for the same site of sampling, either implant or natural teeth, except concentration (0.1mg/ml) as it was significantly deferent (P= 0.26; Table 2).

For CHX concentration, there is no significant difference between aerobic and anaerobic bacteria for the implant and natural Teeth.

Table 2 Differences in inhibition zones, in millimeters (mm), of zinc oxide nanoparticles against aerobic and anaerobic bacteria from the same implants or same natural teeth

<table>
<thead>
<tr>
<th>Conc (mg/ml)</th>
<th>Sites</th>
<th>Bacterial type</th>
<th>No.</th>
<th>Min.</th>
<th>Max.</th>
<th>Mean</th>
<th>SD</th>
<th>SE</th>
<th>t-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>Implant</td>
<td>Aerobic</td>
<td>16</td>
<td>7.50</td>
<td>9.00</td>
<td>8.13</td>
<td>.53</td>
<td>.13</td>
<td>2.343</td>
<td>.026</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>7.00</td>
<td>9.00</td>
<td>7.66</td>
<td>.60</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>8.00</td>
<td>9.00</td>
<td>8.42</td>
<td>.49</td>
<td>.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>7.00</td>
<td>8.00</td>
<td>7.50</td>
<td>.45</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25</td>
<td>Implant</td>
<td>Aerobic</td>
<td>16</td>
<td>9.50</td>
<td>11.00</td>
<td>10.03</td>
<td>.46</td>
<td>.12</td>
<td>3.716</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>8.50</td>
<td>10.50</td>
<td>9.38</td>
<td>.53</td>
<td>.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>10.00</td>
<td>10.50</td>
<td>10.25</td>
<td>.27</td>
<td>.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>8.50</td>
<td>9.50</td>
<td>9.00</td>
<td>.45</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>Implant</td>
<td>Aerobic</td>
<td>16</td>
<td>11.50</td>
<td>13.00</td>
<td>12.31</td>
<td>.54</td>
<td>.14</td>
<td>4.928</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>10.50</td>
<td>12.50</td>
<td>11.38</td>
<td>.53</td>
<td>.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>12.00</td>
<td>13.00</td>
<td>12.50</td>
<td>.45</td>
<td>.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>10.00</td>
<td>12.00</td>
<td>10.83</td>
<td>.75</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Implant</td>
<td>Aerobic</td>
<td>16</td>
<td>14.00</td>
<td>16.00</td>
<td>15.00</td>
<td>.73</td>
<td>.18</td>
<td>4.291</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>13.00</td>
<td>15.00</td>
<td>14.03</td>
<td>.53</td>
<td>.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>14.50</td>
<td>15.50</td>
<td>14.92</td>
<td>.38</td>
<td>.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>13.00</td>
<td>14.00</td>
<td>13.50</td>
<td>.55</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Implant</td>
<td>Aerobic</td>
<td>16</td>
<td>16.00</td>
<td>19.00</td>
<td>17.38</td>
<td>.89</td>
<td>.22</td>
<td>4.907</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>15.00</td>
<td>17.00</td>
<td>16.09</td>
<td>.55</td>
<td>.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>17.00</td>
<td>18.50</td>
<td>18.00</td>
<td>.55</td>
<td>.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>15.00</td>
<td>17.00</td>
<td>15.83</td>
<td>.75</td>
<td>.31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Table 2 Differences in inhibition zones, in millimeters (mm), of zinc oxide nanoparticles against aerobic and anaerobic bacteria from the same implants or same natural teeth**

<table>
<thead>
<tr>
<th></th>
<th>Implant</th>
<th>Aerobic</th>
<th>21.00</th>
<th>23.50</th>
<th>22.19</th>
<th>.85</th>
<th>.21</th>
<th>3.959</th>
<th>.000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>20.00</td>
<td>23.00</td>
<td>21.06</td>
<td>.75</td>
<td>.19</td>
<td>3.456</td>
<td>.006</td>
</tr>
<tr>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>22.50</td>
<td>24.00</td>
<td>23.08</td>
<td>.58</td>
<td>.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>21.00</td>
<td>23.00</td>
<td>21.67</td>
<td>.82</td>
<td>.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.592</td>
<td>0.559</td>
</tr>
<tr>
<td></td>
<td>chx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.274</td>
<td>0.231</td>
</tr>
<tr>
<td></td>
<td>Implant</td>
<td>Aerobic</td>
<td>18.00</td>
<td>22.00</td>
<td>20.19</td>
<td>1.17</td>
<td>.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>19.00</td>
<td>21.00</td>
<td>20.00</td>
<td>.89</td>
<td>.37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>18.00</td>
<td>21.00</td>
<td>19.17</td>
<td>1.33</td>
<td>.54</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.274</td>
<td>0.231</td>
</tr>
<tr>
<td></td>
<td>chx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.592</td>
<td>0.559</td>
</tr>
<tr>
<td></td>
<td>solvent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.274</td>
<td>0.231</td>
</tr>
<tr>
<td></td>
<td>Implant</td>
<td>Aerobic</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anaerobic</td>
<td>16</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural</td>
<td>Aerobic</td>
<td>6</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anaerobic</td>
<td>6</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

The results of antibacterial assessment by disk diffusion method to study the antibacterial activity (the size of inhibition zone) revealed a great association with concentration against aerobic and anaerobic bacteria (17-19).

Concentration directly affected the diameter of inhibition zone as it enlarged by increasing concentration. These results revealed that ZnO-NPs had strong antibacterial effect as it had the ability to kill or inhibit isolated aerobic and anaerobic bacteria of the internal cavity of dental implant and sulcus of the natural teeth. CHX 2% had greater inhibitory effect than ZnO-NPs as demonstrated by the size of inhibition zone where it was larger with the use of CHX. Synergism area between CHX 2% and ZnO-NPs 1mg/ml in all plates had more antibacterial action against tested bacteria as it had powerful effect (18,23-25).

All these results and findings indicated the strong anti-bacterial effect of ZnO-NPs and its beneficial uses in decreasing growth of bacteria.

**Conclusion**

Zinc oxide nanoparticles in different concentrations have anti-bacterial effects on aerobic and anaerobic bacteria isolated from internal cavity of the implant and the sulcus of natural teeth. The sensitivity of aerobic and anaerobic bacteria to ZnO-NPs increased with increasing of the concentration of ZnO-NPs in comparison with CHX 2% and solvent.

**Ethical Clearance:** The study was approved by the Research Ethics Committee at College of Dentistry/University of Baghdad, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**References**


Use of the Naive Bayes Function and the Models of Artificial Neural Networks to Classify Some Cancer Tumors

Shrook A.S. Al-Sabbah¹, Sada Faydh Mohammad¹, Maryam Mahdi Eanad¹
¹Statistics Department, Administration and Economics College, Kerbala University, Iraq

Abstract

This study is concerned with the methods of classification and separation of observations and the use of two methods: of classification Naive Bayes, using the function of Kernel, and models of artificial neural networks using a function to show the step or sample in order to classify three types of cancer tumors (bone, lung, and breast). For a simple random sample of 150 patients, Naive Bayes was the correct classification of data for 67%, while in the method of neural network models, it was 86%. The model of artificial neural networks was found to be the best in classifying views from the Naive Bayes classification. The correct classification of bone cancer is the highest, followed by breast cancer and lung cancer. The relative importance of the variable age was the highest, then sex, and then the period of survival of the patient, and then the profession of the patient, and then the state of exit of the patient.

Keywords: Naive Bayes. Neural Networks. Kernel Function

Introduction

This research is an addition to the studies and research in the study of classification. The methods of the Kernel function are important techniques, which are widely applied to various areas of data analysis because of their flexibility and good performance, and its use in the discriminant analysis depends largely on the appropriate selection of the Package width matrix (H), which reduces the mean integral square error (MISE) and mean of classification error (. And comparing it with the pattern of neural networks which is based on the step function in order to classify three types of cancer tumors (bone, lung, breast) is a repetitive method that makes the error as low as possible through learning or Tearing training to reach to the weights that reduce the error in the classification.

Materials and Method

Objects

Know the parameters of the normal distribution (the mean and the deviation) of each of the three diseases (breast cancer, bone cancer, lung cancer) depending on the Kernel function, as well as knowing the value of the correct classification of data using the Naive Bayes classification.

Using the artificial neural networks model to classify and distinguish between observations and models with qualitative dependent variables.

Practical application of the two methods to compare them.

Theoretical side:

The Kernel Estimator is defined as an estimator based on the weight function which is used in estimating the non-parametric function. It gives weights to the adjacent data points in the estimation procedure.

The Kernel functions are continuous, limited and identical around zero; their real value and their integration are equal to one. They have a similar symmetric probability density function with the symbol \( K(x) \)\(^{1}\).

It is known that the method of these estimates depends mainly on the selection of the bandwidth parameter, which controls the estimation and the selection of the

DOI Number: 10.5958/0976-5506.2019.00938.0
Kernel function. One of the most frequently used functions is the Gaussian (normal) function with mean (0) and the variance (1). The reason is that there are many desirable characteristics, making the choice of bandwidth easier, and these qualities do not exist for other Kernel functions, (Bandwidth) characteristics are non-random, homogeneous, and positive.

The choice of the bandwidth includes the choice of a single parameter that controls the amount of smoothing in a bivariate state. In a multivariate case, the bandwidth matrix controls both the degree and direction of the smoothing, and therefore, its selection is more difficult.

To get a better estimate with one pattern, we use a bandwidth that reduces the Mean Integrated Square Error (MISE).

Results and Discussion

Data Classification

The number of correct classifications and the misclassifications rate or the apparent error rate is calculated by the rating table and Table (1) shows the classification process for two groups:

Table 1: Classification for two groups

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>Number of observation</th>
<th>Predicted Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>n_1</td>
<td>n_{11} n_{12}</td>
</tr>
<tr>
<td>2</td>
<td>n_2</td>
<td>n_{21} n_{22}</td>
</tr>
</tbody>
</table>

Misclassification Rate = \[
\frac{n_{12}+n_{21}}{n_{11}+n_{12}+n_{21}+n_{22}}\]  

Apparent Correct Classification = \[
\frac{n_{11}+n_{22}}{n_{1}+n_{2}}\]  

And apparent correct classification rate (Misclassification Rate) can be calculated as follows:

MR = 1 - (correct classification rate)  

Based on Table (1), MR is obtained using the previous probabilities (\(\hat{p}\)) and KDE for the two group's \(\hat{f}(.;H_1)\) and \(\hat{f}(.;H_2)\); then the Optimal Classification Rate is to reduce the MR as follows:

\[
\hat{f}_i(.;H_1) > \hat{f}_i(.;H_2)\]  

The other cases classify observation (i) into the second group.

Misclassification rate (MR):

In 1988, Hall and Wand (1988) reported a bivariate experiment that found the best bandwidth directly by using the error rate of classification or the MR standard. The formula is as follows:

\[
\hat{M}R = 1 - n^{-1} \sum_{j=1}^{m} 1 \]  

Cost of bad classification:

There are two types of bad classification costs: true and expected. Let K be a number of classifications.

The true cost of bad classification is the K-matrix of dimensions, where (i, j) refers to the cost of the bad classification to predict the observation in row j if its true character is i. According to the formula:

\[
\text{Mdl. Cost}(I, j) = 1 \text{ if } I \neq j \text{ and } \text{Mdl. Cost}(I, j) = 0 \text{ if } I = j \]
Cost of bad classification:

There are two types of bad classification costs: true and expected. Let K be a number of classifications.

The true cost of bad classification is the K-matrix of dimensions, where (i, j) refers to the cost of the bad classification to predict the observation in row j if its true character is i. According to the formula:

\[ \text{Mdl. Cost}(l, j) = \begin{cases} 1 & \text{if } l \neq j \\ 0 & \text{if } l = j \end{cases} \]

That is: Mdl. Cost (i, j) is the cost of bad classification; in other words, the cost is 0 for the correct classification, and 1 for any incorrect classification. The expected cost of the bad classification is a K vector of dimensions, where element k is the weighted average cost of the bad classification of the classification of observations in row k, weighted by the probability of the subsequent class.

\[ c_k = \sum_{j=1}^{K} \hat{p}(Y = 1 | X_1, \ldots, X_P) \text{cost}_{jk} \]

Naive Bayes classifier:

This method is dependent on the value and its class in the vector, and the class is predicted according to the values of the variables. If X is a vector of random variables, it consists of \( X_1 = x_1, X_2 = x_2, \ldots, X_n = x_n \) and C represents random variable referring to classes, then in the Bayes theory, the expected classification error can be reduced by taking a conditional probabilistic sample for each x, as in the following formula:

\[ p(C = c | X = x) = \frac{p(C = c) \ p(C = c | X = x)}{p(X = x)} \]

Since the denominator is fixed then, it has no effect on the final choice and can be neglected. The formula is:

\[ p(C = c | X = x) \propto p(C = c) \ p(C = c | X = x) \quad (7) \]

\[ p(C = c | X = x) = p(\bigwedge_{i=1}^{n} X_i = x_i | C = c) = \prod_{i=1}^{n} p(X_i = x_i | C = c) \quad (8) \]

By combining formulas (7) and (8), the formula becomes as follows:

\[ p(C = c | X = x) \propto p(C = c) \ \prod_{i=1}^{n} p(X_i = x_i | C = c) \quad (9) \]

The probability of \( \prod_{i=1}^{n} p(X_i = x_i | C = c) \) can be estimated from the frequency of observations with \( C = c \) and frequency of observations with \( X_i = x_i, \) \( X_i \wedge C = c \), according to the law of large numbers; this estimate is constant, \( p(X_i = x_i | C = c) \). Observation is classified by estimating the posterior probability of each class, and then assigning the observation to the class, leading to the greatest probability of the posterior[11].

**Artificial Neural Networks** [12]

Artificial neural networks are modern techniques, and they use simulations in a way that is somewhat similar to the work of the brain in accomplishing a particular task through a massive treatment distributed in parallel and consisting of simple processing units. Nodes (Neuron) have a neurological characteristic. They store scientific knowledge and empirical information to make them immune to the user by controlling the weights.

Artificial Neural Networks (ANN) are similar to the human brain in that they acquire knowledge of training and storage of this knowledge using the forces arrived at FH inside the neurons called weights, and there is also a vital neurotransmitter similarity which gives the opportunity for scientists to rely on biological (ANN) to understand the vital phenomena. The output of each node is then processed by a non-linear function with a threshold known as the Activation function. Figure 1 shows the neural network action plan.

![Figure 1: the neural network action plan](image-url)
Classification of Neural Networks

Artificial neural networks can be used to classify the function by determining the activating function. We will adopt the step function (function threshold) as in the following formula:

\[
f(x) = \begin{cases} 
0 & \text{if } x < 0 \\
1 & \text{if } x \geq 0 
\end{cases}
\]

If output is 0, it means that the observation follows the class or the first set; then if the result (output) is 1, the observation follows the class or the second set \(^{[13]}\).

Education or training \(^{[14]}\)

The teaching of the neural network and training gives them the ability to learn and thus access to output with the least possible error by giving the neural network a set of examples, called the category of training, which weigh weights between the units of these methods, Perception method (Perception). This method modifies weights in a repetitive manner by adding the adjustment limit for the value of the weights of the past of Artificial Neural Network Components \(^{[15][16]}\) where any processing unit is composed (Neuron) of the following basic components (Weighting Coefficients, Summation Function, Transfer function, Output function).

Weighting coefficients:

Artificial neural networks depend on the weight of the element, which expresses the degree of relative importance of the input element.

Summation function:

The first operation of the processing unit is the calculation of the sum of the next balanced input to the unit using the addition function. This function calculates the average weights of all incoming inputs to the processing unit and multiplies each input value in its associated weight and then finds the sum for each multiplication interval as follows:

\[
S_i = \sum_{j=1}^{n} X_i W_{ij} \quad (10)
\]

\(S_i\): The sum of the combination process for each treatment unit \(j\).
\(X_i\): The value of the next input from unit \(i\) and input to unit \(j\).
\(W_{ij}\): The weight that connects the processing unit \(i\) to unit \(j\) in the previous layer.

Transfer Function\(^{[16]}\)

The transformative function depends on the cumulative function, which is the internal stimulant, conversion process is the conversion of the sum of the combination to one of the values that are supposed to be within the desired network outputs.

Applied side:

1 - The function of Naive Bayes:

A simple random sample of 150 patients was taken at the hospital in Marjan Medical City in Babylon province to diagnose cancer among people with breast cancer, bone cancer and lung cancer. And to implement Naive Bayes and the artificial neural networks.

In the composition of the discriminant function, we depend on a number of variables that were collected for each sample observation that includes intermittent and continuous variables. The variables were defined as follows:

<table>
<thead>
<tr>
<th>Y</th>
<th>Type of tumor</th>
</tr>
</thead>
<tbody>
<tr>
<td>(X_1)</td>
<td>sex</td>
</tr>
<tr>
<td>(X_2)</td>
<td>age</td>
</tr>
<tr>
<td>(X_3)</td>
<td>Patient job</td>
</tr>
<tr>
<td>(X_4)</td>
<td>discharged from the hospital status</td>
</tr>
<tr>
<td>(X_5)</td>
<td>Survival time</td>
</tr>
</tbody>
</table>

Using the Matlab program for cancer patient data and preparing the data according to the Gaussian Kernel function for combined observations and each of the three tumors. By applying equation (4) and (5), osteoporosis was spread around one, with an average of \(\mu = 1.4400\) and a deviation \(\sigma = 0.5014\), as well as in lung cancer spread around one, with an average of \(\mu = 1.4200\) and a standard deviation of \(\sigma = 0.4986\). Breast cancer is spread around the two, with an average of 1.9600 and a standard deviation of \(\sigma = 0.1979\). The program classifies the views into the corresponding category with the lowest cost of the expected poor rating. The application of the formula (16) shows that the correct classification of the data was equal to 0.6667 and the loss value was 0.1600.
For the sake of illustration, the density functions of the three cancer tumors were plotted as in Fig. 2:

For the sake of illustration, the density functions of the three cancer tumors were plotted as in Fig. 2:

**Figure 2: Naïve Bayes for classification**

![Kernel density estimate](image)

**Figure 3: Kernel Density Function for cancer diseases**

To calculate the number of data points within each period represented by histories representing replication, the graph is centered in the middle of each period and reflects the high average number of data points in that period. Bandwidth is (0.2707) and determines the width of the Kernel function. displays Density window around each point. It is the “optimal” display which would reduce the mean of the error box if the data uses a Gaussian Kernel Function?

**Figure 4: neural network architecture**

The neural network model is summarized as follows:

**Table 2: neural network model**

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>Cross Entropy Error</th>
<th>Percent Incorrect Predictions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>39.522</td>
<td>18.0%</td>
</tr>
<tr>
<td>Stopping Rule Used</td>
<td>1 consecutive step(s) with no decrease in error</td>
<td></td>
</tr>
<tr>
<td>Training Time</td>
<td>0:00:00.06</td>
<td></td>
</tr>
<tr>
<td>Testing</td>
<td>17.085</td>
<td>14.0%</td>
</tr>
<tr>
<td>Dependent Variable: Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Error computations are based on the testing sample.

It is clear from Table (2) that the percentage of wrong classification in the training sample was 18%, while the wrong classification in the test sample was 14%, which is close. This indicates that the network has been well trained in the classification of new units. Stopping Rule Used is when the error rate is constant or when the error rate stops increasing, depending on the test ratio, as shown in the table that the network training time is 6 seconds.
### Table 3: Results of classification using neural network

<table>
<thead>
<tr>
<th>Classification</th>
<th>Sample</th>
<th>Observed</th>
<th>Predicted</th>
<th>Percent Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>breast cancer</td>
<td>Bone cancer</td>
<td>lung cancer</td>
</tr>
<tr>
<td>Training</td>
<td>breast cancer</td>
<td>30</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Bone cancer</td>
<td>1</td>
<td>32</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>lung cancer</td>
<td>9</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Overall Percent</td>
<td>40.0%</td>
<td>34.0%</td>
<td>26.0%</td>
</tr>
<tr>
<td>Testing</td>
<td>breast cancer</td>
<td>13</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Bone cancer</td>
<td>0</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>lung cancer</td>
<td>6</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Overall Percent</td>
<td>38.0%</td>
<td>32.0%</td>
<td>30.0%</td>
</tr>
</tbody>
</table>

Dependent Variable: Y

Table (3) shows that the correct classification rate for breast cancer was 83.3% in the training sample, while it was 92.1% in the testing sample. The correct classification of bone cancer was 94.1% in the training sample, while it was 100% in the test sample, the correct classification of lung cancer was 66.7% in the training sample and 70% in the test sample, which is a very good predictor of new vocabulary.

### Table 4: Analysis of the relative importance of independent data

<table>
<thead>
<tr>
<th>Independent Variable Importance</th>
<th>Importance</th>
<th>Normalized Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1 sex</td>
<td>.210</td>
<td>39.3%</td>
</tr>
<tr>
<td>X2 age</td>
<td>.535</td>
<td>100.0%</td>
</tr>
<tr>
<td>X3 Patient job</td>
<td>.075</td>
<td>14.0%</td>
</tr>
<tr>
<td>X4 discharged from the X5 hospital status</td>
<td>.029</td>
<td>5.3%</td>
</tr>
<tr>
<td>X5 Survival time</td>
<td>.152</td>
<td>28.3%</td>
</tr>
</tbody>
</table>

It is clear from Table (4) that the most important variable in the classification using the neural network is the variable (age X2) with a significance rate of 0.535, followed by a variable (sex X1) by significance of 0.21, and then variable (survival of patient X5) 0.152, followed by variable (patient career) X3 with a significance rate of 0.075 and finally variable (case of exit of patient X4) with a significance of 0.029. It is clear that the most important variable in the classification of cancer (breast cancer, bone cancer, lung cancer) while the variable patient exit status is not important in the classification of cancer, with an impact of almost zero.

The last column of the table is the importance of independent variables for the largest relative importance of those variables.

### Conclusions

1 - The model of artificial neural networks was found to be the best in classifying views from the Naive
Bayes classification.

2 - The correct classification of bone cancer is the highest, followed by breast cancer and lung cancer.

3 - The relative importance of the variable age was the highest, then sex, and then the period of survival of the patient, and then the profession of the patient, and then the state of exit of the patient.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


11. Yang, Ying and Webb, Geoff  I. “ On Why Discretization Works for Naive-Bayes Classifiers” , School of Computer Science and Software Engineering, Monash University, Melbourne, VIC 3800, Australia.


Clinico- Epidemiological Study of Patients with Erectile Dysfunction Attending Al-Kadymia Teaching Hospital in Baghdad

Atta Ah Mousa Al-Sarray¹, Waleed Arif Al-Ani², Sameeha Naser Abed
¹Community Medicine /Middle Technical University/Iraq, ²Community Medicine / Mustansyria University / Iraq, ³Master Community Health Tech. Middle Technical University /Iraq

Abstract

Background: Erectile dysfunction (ED) is a pervasive problem among men worldwide. The aim of current study was to determine the clinico-epidemiological features of patients with erectile dysfunction and different associated factors. Method: A descriptive cross sectional study was carried out for a period of six months starting on 1st of October 2017 till the end of March 2018. Results: The prevalence of ED was 35% among a patients attending Al-Kadymia Teaching Hospital during the period of the study with mean±SD age of ED patients of 53±10 years, while 52±12 years for non-ED patients. Regarding the degree of ED, 35.34% had mild, 32.76% had mild to moderate, 18.97% had moderate and 12.93% for severe cases of ED. Most cases of study sample from urban area (68.48%) and had primary education, employed and married. Significant association was found between patients with ED and history of diabetes, cardiovascular diseases & diabetes with hypertension, cigarette smoker and alcohol drinker & lipid profile, while non-significant association was found between ED patients and other risk factors. Highest percentage (54.31%) were improved after treatment compared to (45.69%) who did not improve. Higher percentage of ED patients (25%) had duration of ED of 7-9 years, while lower percentage (12.07%) had duration ≥10 years.

Conclusion: The prevalence of ED was 35% in patients attending Al-Kadymia Teaching Hospital during the period of the study. Significant association was found between patients with ED and history of diabetes, cardiovascular diseases & diabetes and hypertension, cigarette smokers, alcohol drinkers & lipid profile abnormality.

Keywords: Erectile dysfunction, Prevalence, Diabetes mellitus, Cardiovascular diseases, Demographic variables.

Introduction

Erectile dysfunction (ED) is a highly prevalent health problem that affects 30 million men in the USA. It is a common worldwide clinical problem with tens of thousands of new cases per year [1]. ED seems to be a very sensitive question and most individuals do not wish to be made aware [2]. ED can result from poor physical or poor psychological health or both. The principal risk factors are diabetes mellitus, heart disease, hypertension and prostatic hypertrophy [3]. The problem of erectile dysfunction is mainly linked to age, as shown in the Massachusetts Male Aging Study, where 52% of the male study population aged 40–70 years had some degree of erectile dysfunction [4]. The causes of ED are multi-fatorial, which include anatomical, vascular, neurological, hormonal and psychological factors [5]. Since it is not a life-threatening condition, many men take it for granted and leave it undiagnosed and untreated [6]. In addition, because of the perception of people that ED is a “taboo” subject, patients tend to ignore it from the aspect of health care [7]. This situation might lead to approximately 322 million men worldwide being affected by ED by 2025 [8]. Findings from other studies have shown that certain environmental
and lifestyle factors, such as smoking, obesity, and limited or an absence of physical exercise, might also be important predictors of erectile dysfunction \(^9\). It is also reported that psychological problems such as depression, performance anxiety, and relationship problems could be complications and risk factors of ED \(^{10}\). The current study was carried out to determine the clinico-epidemiological features of patients with erectile dysfunction and different associated factors.

**Patients and methods**

**Study design**

A descriptive cross sectional study.

**Study setting**

The current study was conducted in Al-KLadymia Teaching Hospital in Baghdad for the period from 1\(^{st}\) of October 2017 till the end of March 2018.

**Study population**

Study population included all patients attending genitourinary clinic in Al-Kadymia Teaching Hospital during the period of the study.

**Data collection**

Data were collected using a well-designed questionnaire form constructed by the researchers. Subjects were interviewed and information was collected on demographic and epidemiologic variables, medical and surgical history, smoking history and laboratory examination for lipid profile for each subject. A systematic random sampling method was used to recruit the subjects into the study. Every 5\(^{th}\) man who attended the clinic on each clinic day. So it was convenient to carry out sampling in systematic way (through regular interval), then checklist for assessment of erectile functionality and evaluation. ‘The check list used is an abridged version of International Index of Erectile function (IIEF) \(^{11}\) made up of five direct questions about sexuality, with five answer options for each question making a total score of 25. Evaluation of erectile function was based on the scoring system with 22-25 taken as not having ED, 17-21 as mild, 12-16 as mild to moderate, 8-11 as moderate and 1-7 as severe’.

**Statistical Analysis**

Analysis of data was carried out using Statistical Packages for Social Sciences; SPSS version 24). Data were presented in simple measures of frequency, percentage, mean and standard deviation. The significance of difference of different percentages (qualitative data) was tested using Pearson Chi-squared test with application of Yate’s correction or Fisher Exact test whenever applicable. Statistical significance was considered whenever the P value was equal or less than 0.05.

**Results**

**Table 1: Distribution of study sample according to demographic variables**

<table>
<thead>
<tr>
<th>Demographic variables No.</th>
<th>With ED Subjects (n=116)</th>
<th>Without ED Subjects (n=214)</th>
<th>Total (n=330)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30---39</td>
<td>23</td>
<td>19.83</td>
<td>38</td>
</tr>
<tr>
<td>40---49</td>
<td>25</td>
<td>21.55</td>
<td>43</td>
</tr>
<tr>
<td>50---59</td>
<td>30</td>
<td>25.86</td>
<td>46</td>
</tr>
<tr>
<td>60---69</td>
<td>38</td>
<td>32.76</td>
<td>87</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>85</td>
<td>73.28</td>
<td>141</td>
</tr>
<tr>
<td>Rural</td>
<td>31</td>
<td>26.72</td>
<td>73</td>
</tr>
</tbody>
</table>

\(^{9}\) Grover, B.K., Dhawan, R., 
\(^{10}\) Khan, S., Saeed, M., 
\(^{11}\) The International Index of Erectile Function (IIEF) Questionnaire.
Mean±SD age of ED patients was 53±10 years, while it was 52±12 years for non-ED patients. Most cases of study sample from urban area (68.48%) and had primary education, employed and married. The association between study sample (patient with & without ED) and demographic (age groups, residence, education & Employment status) was found to be statistically not significant (table 1).

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>With ED Subjects (n=116)</th>
<th>Without ED Subjects (n=214)</th>
<th>Total (n=330)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>No%</td>
<td>%</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>40 (34.48)</td>
<td>29 (13.55)</td>
<td>69 (20.91)</td>
</tr>
<tr>
<td>Negative</td>
<td>76 (65.52)</td>
<td>185 (86.45)</td>
<td>261 (79.09)</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>47 (40.52)</td>
<td>55 (25.70)</td>
<td>102 (30.91)</td>
</tr>
<tr>
<td>Negative</td>
<td>69 (59.48)</td>
<td>159 (74.30)</td>
<td>228 (69.09)</td>
</tr>
<tr>
<td>Diabetes + Hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>51 (43.97)</td>
<td>54 (25.23)</td>
<td>105 (31.82)</td>
</tr>
<tr>
<td>Negative</td>
<td>65 (56.03)</td>
<td>160 (74.77)</td>
<td>225 (68.18)</td>
</tr>
<tr>
<td>Perineal trauma &amp; surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>29 (25.00)</td>
<td>38 (17.76)</td>
<td>67 (20.30)</td>
</tr>
<tr>
<td>Negative</td>
<td>87 (75.00)</td>
<td>176 (82.24)</td>
<td>263 (79.70)</td>
</tr>
<tr>
<td>Medication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>4 (3.45)</td>
<td>8 (3.74)</td>
<td>12 (3.64)</td>
</tr>
<tr>
<td>Negative</td>
<td>112 (96.55)</td>
<td>206 (96.26)</td>
<td>318 (96.36)</td>
</tr>
<tr>
<td>Psychological</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>51 (43.97)</td>
<td>85 (39.72)</td>
<td>136 (41.21)</td>
</tr>
<tr>
<td>Negative</td>
<td>65 (56.03)</td>
<td>129 (60.28)</td>
<td>194 (58.79)</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>56 (48.28)</td>
<td>73 (34.11)</td>
<td>129 (39.09)</td>
</tr>
<tr>
<td>Negative</td>
<td>60 (51.72)</td>
<td>141 (65.89)</td>
<td>201 (60.91)</td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>38 (32.76)</td>
<td>46 (21.50)</td>
<td>84 (25.45)</td>
</tr>
<tr>
<td>Negative</td>
<td>78 (67.24)</td>
<td>168 (78.50)</td>
<td>246 (74.55)</td>
</tr>
<tr>
<td>Lipid profile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>normal</td>
<td>51 (49.97)</td>
<td>126 (58.88)</td>
<td>177 (53.64)</td>
</tr>
<tr>
<td>abnormal</td>
<td>65 (50.03)</td>
<td>88 (41.12)</td>
<td>153 (46.36)</td>
</tr>
</tbody>
</table>

Table 1: Distribution of study sample according to demographic variables

Table 2 Distribution of study sample according to the risk factors
Significant association was found between patients with ED and history of diabetes, cardiovascular diseases and diabetes with hypertension, smoking and alcohol & lipid profile, whereas non-significant association was found between ED patients and other risk factors (Table 2).

Figure 1 The degree of ED patients.

Highest percentage (41.35%) of ED patients had mild disease, (38.35%) were mild to moderate, (22.19%) had moderate disease and 15.13% had severe ED.

Table 3 Distribution of ED patient according to outcome

<table>
<thead>
<tr>
<th>Outcome</th>
<th>ED</th>
<th>Mild</th>
<th>Mild to moderate</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Improved</td>
<td>28</td>
<td>68.29</td>
<td>20</td>
<td>52.63</td>
<td>7</td>
<td>31.82</td>
</tr>
<tr>
<td>Not improved</td>
<td>13</td>
<td>31.71</td>
<td>18</td>
<td>47.37</td>
<td>15</td>
<td>68.18</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
<td>38</td>
<td>100</td>
<td>22</td>
<td>100</td>
</tr>
</tbody>
</table>

Pearson Chi-Squared Tests = 6.916, df= 3, p= 0.075.

Regarding ED, higher percentage (54.31%) were improved after treatment compared to (45.69%) who were not improved and the association was found to be statistically not significant (p= 0.075, Table 3).

Table 4 Distribution of degree of ED according to duration

<table>
<thead>
<tr>
<th>Duration/year</th>
<th>ED</th>
<th>Mild</th>
<th>Mild to moderate</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>&lt;1 years</td>
<td>9</td>
<td>21.96</td>
<td>10</td>
<td>26.32</td>
<td>3</td>
<td>13.64</td>
</tr>
<tr>
<td>1-3</td>
<td>9</td>
<td>21.95</td>
<td>9</td>
<td>23.68</td>
<td>4</td>
<td>18.18</td>
</tr>
<tr>
<td>4-6</td>
<td>7</td>
<td>17.07</td>
<td>8</td>
<td>21.06</td>
<td>9</td>
<td>40.91</td>
</tr>
<tr>
<td>7-9</td>
<td>10</td>
<td>24.39</td>
<td>9</td>
<td>23.68</td>
<td>3</td>
<td>13.64</td>
</tr>
<tr>
<td>≥10</td>
<td>6</td>
<td>14.63</td>
<td>2</td>
<td>5.26</td>
<td>3</td>
<td>13.64</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
<td>38</td>
<td>100</td>
<td>22</td>
<td>100</td>
</tr>
</tbody>
</table>

Pearson Chi-Squared Tests 16.253, df= 14, p= 0.365.
Higher percentage of ED patients (25%) had duration of 7-9 years, while lower percentage (12.07%) had duration of ≥10 years and the association was found to be statistically not significant (p= 0.365).

Table 5 Distribution of ED patient according to type of treatment

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>ED</th>
<th>Mild</th>
<th>Mild to moderate</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Herbal /traditional</td>
<td>5</td>
<td>12.20</td>
<td>7</td>
<td>18.42</td>
<td>5</td>
<td>22.73</td>
</tr>
<tr>
<td>Medical</td>
<td>32</td>
<td>78.05</td>
<td>28</td>
<td>73.68</td>
<td>12</td>
<td>54.55</td>
</tr>
<tr>
<td>Dietary control</td>
<td>4</td>
<td>9.75</td>
<td>3</td>
<td>8.33</td>
<td>5</td>
<td>22.73</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
<td>38</td>
<td>100</td>
<td>22</td>
<td>100</td>
</tr>
</tbody>
</table>

Pearson Chi-Square Tests =7.236, df= 6, p= 0.300.

Higher percentage of ED (71.55%) used medical therapy, 17. 24% used herbal /traditional & 11.21% used dietary control and the association was found to be statistically not significant (p= 0.300).

Table 6 Distribution of ED patient according to demographic variables

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Mild (n=41)</th>
<th>Mild to moderate (n=38)</th>
<th>Moderate (n=22)</th>
<th>Severe (n=15)</th>
<th>Total (n=116)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30---39</td>
<td>14</td>
<td>34.15</td>
<td>1</td>
<td>2.63</td>
<td>9.09</td>
<td>40.00</td>
</tr>
<tr>
<td>40---49</td>
<td>4</td>
<td>9.76</td>
<td>9</td>
<td>23.68</td>
<td>8</td>
<td>36.36</td>
</tr>
<tr>
<td>50---59</td>
<td>8</td>
<td>19.51</td>
<td>11</td>
<td>28.95</td>
<td>6</td>
<td>27.27</td>
</tr>
<tr>
<td>60---69</td>
<td>15</td>
<td>36.59</td>
<td>17</td>
<td>44.74</td>
<td>6</td>
<td>27.27</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>29</td>
<td>70.73</td>
<td>26</td>
<td>68.42</td>
<td>17</td>
<td>77.27</td>
</tr>
<tr>
<td>Urban</td>
<td>12</td>
<td>29.27</td>
<td>12</td>
<td>31.58</td>
<td>5</td>
<td>22.73</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>8</td>
<td>19.51</td>
<td>6</td>
<td>15.79</td>
<td>2</td>
<td>9.09</td>
</tr>
<tr>
<td>Primary</td>
<td>16</td>
<td>39.02</td>
<td>10</td>
<td>26.32</td>
<td>10</td>
<td>45.45</td>
</tr>
<tr>
<td>Secondary</td>
<td>9</td>
<td>21.95</td>
<td>11</td>
<td>28.95</td>
<td>7</td>
<td>31.82</td>
</tr>
<tr>
<td>College</td>
<td>8</td>
<td>19.51</td>
<td>11</td>
<td>28.95</td>
<td>3</td>
<td>13.64</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>37</td>
<td>90.24</td>
<td>35</td>
<td>92.11</td>
<td>21</td>
<td>95.45</td>
</tr>
<tr>
<td>Not employed</td>
<td>4</td>
<td>9.76</td>
<td>3</td>
<td>7.89</td>
<td>1</td>
<td>4.55</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>38</td>
<td>92.68</td>
<td>36</td>
<td>94.74</td>
<td>19</td>
<td>86.36</td>
</tr>
<tr>
<td>Single</td>
<td>3</td>
<td>7.32</td>
<td>2</td>
<td>5.26</td>
<td>3</td>
<td>13.64</td>
</tr>
</tbody>
</table>

Significant association was found between ED patients and age groups, while non-significant association was found between demographic variables such as residence, education, employment status & marital status.
Erectile dysfunction is a highly prevalent problem that remains silent and under-treated. Primary care physicians need to begin the evaluation of erectile function in patients who are considered at high risk. A focused history, physical examination and laboratory evaluation are often helpful in identifying risk factors for erectile dysfunction [12]. The prevalence of ED was 35% among patients attending Al-Kadymia Teaching Hospital during the period of the study with mean±SD age of ED patients of 53±10 years, while 52±12 years for non-ED patients. These data were in accordance with previously conducted studies [13,14]. The true prevalence of ED among the general population cannot be extrapolated from this study because the sample is considered as a convenient sample which is subjected to selection bias and does not represent the total ED patients in the community. Although, the percentage of 35% found in this study was lower compared to the findings in previous studies, this is significant in view of the fact that men with ED do not always speak in confidence to other people or readily seek medical advice. The prevalence of erectile dysfunction varies according to certain characteristics such as age, social characteristics, socioeconomic status, and concomitant disease conditions. The relation with age has been recognized in some studies [15]. It is strongly related to age with its prevalence increasing with age [16]. The current study also shed light on this fact which showed higher percentage of ED patients in older age groups. As one gets older, erections may take longer to develop and may not be very firm, this might be due to several reasons including changes in the testicles and age-related decline in male sex hormones have been added for the increasing frequency of ED in older men [17,18]. As a direct consequence of getting older, or as a result of underlying co-morbid conditions or medications, which is more common in older men [19]. Also, it has been found to be more prevalent in patients with associated medical conditions such as diabetes, hypertension, as well as among heavy cigarette smokers and those who consume lots of alcohol [18]. This was approved in the current study in which significant association was found between patients with ED and history of diabetes, cardiovascular diseases & diabetes with hypertension, smoking and alcohol drinkers & lipid profile abnormality. Furthermore, a study reported that diabetic men have a three to four times increased tendency to develop sexual dysfunction compared to the healthy population [19]. There is no single etiology that can explain the occurrence of diabetic impotency [20]. Regarding the degree of ED, 35.34% had mild, 32.76% had mild to moderate, 18.97% had moderate and 12.93% had severe ED. These results were similar to other reported studies [21]. Regarding the outcome, higher percentage (54.31%) were improved after treatment compared to (45.69%) who did not improve. This finding was parallel to other previously conducted studies [21].

Conclusion

We found that the prevalence of ED was 35% in patients attending Al-Kadymia Teaching Hospital during the period of the study. Significant association was found between patients with erectile dysfunction (ED) and history of diabetes, hypertension & diabetes with hypertension, cigarette smokers, alcohol drinkers & lipid profile abnormality.

Ethical Clearance: The study was approved by the Research Ethics Committee at AL-Kadymia Teaching Hospital, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

References


Surface Roughness of Two Scannable Die Materials

Raja’a M. Albuha Al-Mussawi¹, Farzaneh Farid², Ola M. Aljibori¹, Athraa M. Dheyaa⁴, Ahmad Reza Shamshiri⁵

¹Department of Prosthodontic, College of Dentistry, University of Kufa, Najaf, Iraq. ²Department of Prosthodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran. ³Department of Prosthodontic, College of Dentistry, University of Kufa, Najaf, Iraq. ⁴Department of Pharmacology, Al- Kafeel University College/Iraq. ⁵Research Center for Caries Prevention, Dentistry Research Institute, Department of Community Oral Health, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Surface roughness influences the marginal and internal adaptation of the prosthesis. It also can affect the accuracy of scanned data in CAD/CAM techniques.

Purpose - present study compared surface roughness of a stone and a polyurethane die material.

Methodology – An identical aluminum model in form of prepared premolar was made using CNC milling machine. Poly vinylsiloxane impressions were made from the model. Half of the impressions were poured with type IV stone and the other half with the exacto-form resin die material. Surface roughness of each die was measured by profilometer. The data were analyzed with ANOVA and Tukey’s test at 95% level of confidence (p=0.05).

Results – the mean value of surface roughness for stone die material was 1.79529, and for exacto-form was .89414μm. The difference was significant.

Conclusion – the surface of Exacto-form poly urethane dies is less rough in comparison with stone dies.

Key Words - Die materials- Dental models- surface roughness –scanning- Dental Scanners.

Introduction

Fabricating esthetically, mechanically and biologically ideal indirect restorations which survive mechanical and chemical conditions of oral cavity has been the ultimate goal of dental practice⁴. To fulfill this goal, the first step is to make a precise duplicate of oral structures and the relation of abutment and non-abutment teeth to each other. And it is done by taking impression of dental tissues, using impression materials or scanners. In recent years the popularity of data acquisition by scanning has increased because of development, progress and increasing popularity of CAD/CAM techniques for fabricating indirect restorations. The data is used to form the virtual model of the oral structures, and to design the restoration on it. Scanning might be oral cavity impressions or cast models of oral cavity. When casts are scanned, the properties of its material can affect the precision of data acquisition⁷.

For a long time, dental stones types IV and V have been used for making working models in dentistry. They are inexpensive, easy to use, dimensionally accurate and generally compatible with most of impression materials³. Their main disadvantage is low abrasion resistance, low tensile strength for being burnished in full porcelain margins, low detail reproduction in comparison with resins and high brittleness in case of long and thin dies¹. In an attempt to overcome these disadvantages, the resin modified stones, epoxy resins and poly urethane resins were introduced. They have better mechanical properties but high cost, incompatibility with impression
materials and high contraction during setting\textsuperscript{[3]}. For scanning the casts, the model and die materials should be accurately scannable. In 2013 International Organization for Standardization (ISO) No. 6873 revised the requirements for type IV stone to encompass scannable stones. It is desirable these stones to have superior dimensional stability and high reproducibility, have less expansion (0.07\%) and microbubbles. They should not be shiny or need powder for being scanned. Also their surface should be smooth and doesn’t show much roughness. Surface roughness influences the adaptation of the restoration on the abutment and necessitates adjustments to fit it\textsuperscript{[6,7]}. Results of Kim et al study on the Impact of surface roughness of gypsum materials on the adaptation of zirconia cores showed a clear positive linear correlation between surface roughness of different stone types and the precision of fit of zirconia cores ($P<.05$). They reported that dental stones used during the process of converting the working model to a 3D digital model through a CAD program can influence precision of fit of the resulting prosthesis\textsuperscript{[2]}. The present study compares the surface roughness of two die materials. 

**Materials and Method**

**Preparing Master die**

By using CNC milling machine (imesicore/450i, Germany), an aluminum master die was prepared with 10 mm cervical diameter, 6 mm height, 6° total occlusal convergences and 1mm wide rounded shoulder finish line.

**Making Dies**

Fourteen custom made impression trays were used to make two-step poly vinyl siloxane (Panasil, Germany) impressions of the aluminum master die. In order to have similar impression procedure, Small perforated plastic cup (20mm diameter, 20mm height) used as impression trays, were attached to the upper member of an articulator by means of magnetic rings. The master dies were attached to the lower member and centered into the middle of the cup. Light body (type 3. Panasil, Germany) was injected around the surface of the master dies. Heavy body (Putty soft, type 0. panasil, Germany) was placed in the tray and the articulator was closed. After setting of impression material, it was separated from the master dies. Excess impression material was trimmed away with a scalpel (Figure no.1). The impressions were randomly allocated into two groups of 7 each according to the type of used die material. For stone group, type IV stone (Ultra hard Snow Rockdie stone UD/Korea) was mixed as manufacturer’s recommended water/powder ratio ($W/P = 20\text{ml}/100\text{g}$), under 710 mm Hg vacuum for 60 seconds. The stone was vibrated into the impression and allowed to set for one hour at ambient room temperature and humidity before removal from the impression (20corr). Exacto- form model resin die material has two-component. The particles of the components may residue during storage, so each of the components should be stirred completely before mixing with the other in order to get a homogenous mixture. After that component B (resin) was added to A and mixed together thoroughly for 30 seconds, the uniform color mixture was then poured swiftly into the impression. Although the Exacto- form dies were removed after 30 minutes of mixing, they would achieve final hardness after 90 minutes.

If there were any defects like air bubbles or imperfections the replicas were repoured.

**measuring Surface roughness**

Profilometer (TR200) was used to measure surface roughness(fig-1). Each die was tested three times and the mean of readings each die was calculated. The mean and standard deviation values of surface roughness for each group were measured using these calculations, and compared with independent samples test.

**Figure (1): Surface roughness of Die Stone and Exacto-Form resin.**
Results

Test of normality table (Table 1) showed that sig = 0.200 > 0.05 for both Die stone and Exacto-form resin die materials which mean that data are subject to normal distribution, and the graph for each one of them illustrates this (figure 2,3).

Table (1): Normality table showed the significant of Die stone and Exacto-form resin die materials.

<table>
<thead>
<tr>
<th>Material</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface roughness</td>
<td></td>
</tr>
<tr>
<td>Die Stone</td>
<td>0.200</td>
</tr>
<tr>
<td>Exacto-form resin</td>
<td></td>
</tr>
</tbody>
</table>

![Figure (2): Normal distribution for Surface roughness of Die stone data.](image)

![Figure (3): Normal distribution for Surface roughness of Exacto-form resin data.](image)

Group Statistics table (Table-2) showed that the size sample of Die stone and Exacto-form is equal (7) and the mean surface roughness of die stone is more than that of Exacto-form by 0.901, standard deviation for both materials is nearly equal, the difference between them is (0.185) so there is no significant dispersion between data.

Table (2): Mean surface roughness, standard deviation and standard error of Die stone and Exacto-form resin die materials.

<table>
<thead>
<tr>
<th>Material</th>
<th>N</th>
<th>Mean Surface roughness (micrometer)</th>
<th>Standard Deviation</th>
<th>Standard Error of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Die Stone</td>
<td>7</td>
<td>1.795</td>
<td>0.538285</td>
<td>0.203452</td>
</tr>
<tr>
<td>Exacto-form resin</td>
<td>7</td>
<td>0.894</td>
<td>0.352944</td>
<td>0.133400</td>
</tr>
</tbody>
</table>

Independent samples test (Table-3) has two parts:

The first one (Leven’s Test for Equality of Variances) showed sig = 0.323> 0.05 this indicates a homogeneity in variance for both materials which mean that there is no significant dispersion of data.

The other part (t-test for Equality of means) showed a significant difference between tested groups sig. (2tailed) = 0.03< 0.05.

Table (3): Independent samples test.

<table>
<thead>
<tr>
<th>Material</th>
<th>Sig.</th>
<th>sig. (2tailed)</th>
<th>95% Confidence Interval for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface roughness equal variances assumed</td>
<td>.323</td>
<td>.003</td>
<td>.371066</td>
</tr>
</tbody>
</table>
Discussion

This study compared the roughness of two die materials. The results showed that poly urethane had less surface roughness in comparison with type IV stone. The same is reported by Fan et al in their study on different types of die materials[8].

Different factors may influence surface roughness of the of stone casts like surface roughness of the original objects, the kind of the impression material and the particle size of the stone material, filler additives and use of surfactants[2]. In this study the same elastomeric impression material was used for making dies of both groups and the materials were prepared according to manufacturer’s instruction for use.

Kim et al showed the surface roughness of gypsum materials had a significant impact on adaptation of zirconia cores. They concluded that the rougher the cast the more is marginal gap of the core. It means that surface roughness of the die material had negatively influenced the data acquisition[2].

Both dies are fabricated under a corresponding condition and the explanation of this finding probably because of the irregularities and undulating present in the scanned area lead to missing a lot of data during scanning procedure that lead to reflected the incident laser beam away from their focus point in the receptor device or camera that mean more smoothing more data captured during a scanning procedure while less smoothing (high roughness) mean there are a lot of data loss, that produce irregular distorted 3D virtual model, this finding supported with Al-Jubouri and Azari they concluded that the computer cannot be clearly read the image captured by dental scanner that lead to produce irregular distorted model[9]. This results appears to be similar to the results of Kim et al ,when mentioned that, scannable stone exhibits a very smooth surface and a very low surface roughness, resulting in superior scannability[2].

Nowadays, the attentions in CAD/CAM systems in dentistry are increased, this was mainly due to minimizing the process accomplished with manpower and labor-intensive laboratory processes associated with the conventional ways of producing dental restorations and time consuming production procedures, cost effectiveness and quality control in shorter period of time[10-13].

Several scanner devices had been used to collect a 3D data of the geometry of a physical object and converted it into a digital data[14].

In current study, dental laser scanner (3Shap, Denmark) was used to acquired digital data from the standard die in order to produce two types of dies (stone and Exactoform resin die).

Conclusion

The mean values for surface roughness of die stone dies was significantly higher than those of exacto-form resin.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding


References


Gene Polymorphism of Interleukin 1β and Oxidative Stress in Gastritis Patients Infected with Helicobacter pylori

Suhayr A. AlQaysi1, Heba M.ALKatawe1, Huda AI-Hasnawy1
1College of Medicine/ University of Babylon, Iraq

Abstract

Background: Gastritis represents a state of inflammation, irritation and erosion of gastric mucosa that occur suddenly (acute) or step by step (chronic). H. pylori is a spiral gram-negative rod bacteria that has the ability to colonize and infect the stomach. The cytokine gene interleukin (IL)-1β has been concerned in influencing the pathology of inflammation induced by H. pylori infection. The aim of current study was to study the role of H. pylori infection and IL-1β in pathogenesis of gastritis as well as to study the impact of C-511T (rs16944) polymorphism in the promoter region of the IL-1β gene. Method: This case control study included 90 subjects (60 patients and 30 controls). The detection of H. pylori in serum was achieved by H. pylori Antibody Rapid test cassette. Parameters that were measured by ELISA technique were human Interleukin IL-1β level, serum Malondialdehyde concentration and serum Glutathione concentration; whereas serum Total Antioxidant capacity (TAC) was measured by spectrophotometer. IL-1β Gene C-511T (rs16944) polymorphism was measured by using Single-Strand Conformation Polymorphism (PCR-SSCP) after amplified by a polymerase chain reaction (PCR) with specific published primers. Results: IL-1β decreased significantly in patients who are positive for H. pylori. However, no significant increment was observed in those negative for H. pylori. Serum MDA increased significantly in gastritis patients when compared with controls. Also, there was significant increase in negative H. pylori. Serum GSH and serum TAO increased significantly in negative H. pylori patients when compared with control groups. TAO increased significantly in positive H. pylori when compared with negative H. pylori patients. Haplotypes pattern that increased significantly in gastritis patients were A and B (1.66% and 3.33%, respectively). Conclusion: In Iraqi population, the gene polymorphisms with D haplotype were associated with chronic gastritis and mainly development of H. pylori-infected individuals. No correlation was found between IL-1β -511 gene polymorphisms in any gastric disease with A,B and C haplotypes. Gastritis with H. pylori infection plays an important role in development of oxidative stress.

Keywords: H. pylori, IL-1β, IL-1β Gene C-511T (rs16944) polymorphism, Malondialdehyde, Glutathione, Total Antioxidant capacity.

Introduction

Gastric diseases confer with diseases touching the stomach. “Inflammation of the abdomen by infection from any cause is called gastritis”[1]. “Gastritis is a condition in which the stomach lining, known as the mucosa, is inflamed”[2]. Common causes of gastritis include infection with Helicobacter pylori (H. pylori) and use of non-steroidal anti-inflammatory drugs and fewer common causes including alcohol, smoking, cocaine, severe illness, autoimmune problems, irradiation therapy and inflammatory bowel diseases[3]. Helicobacter pylori may be a fragile bacterium that has found a perfect place, the protecting secretion layer of the abdomen, the mucous layer that protects the stomach cells from acid also protects H. pylori bacteria. H. pylori infection may cause both acute and chronic gastritis[4]. Epidemiological studies had indicated that inflammation induced by H. pylori infection was regulated by several interleukins (ILs) including the

Corresponding author:
Huda AI-Hasnawy
Email: hudashmm@gmail.com
pro-inflammatory cytokine Interleukin 1 beta (IL-1β) \cite{8}. The (IL)-1β gene has been concerned in influencing the pathology of inflammation elicited by H. pylori infection \cite{8}. IL-1β acts as an inhibitor of viscus acid secretion and plays vital roles in initiating and amplifying the inflammatory responses to H. pylori infection, however, finally permitting extension of H. pylori colonization from the viscus bodily cavity to the corpus, resulting in more progression of inflammation\cite{9}. IL-1β (encoded by IL-1B gene) is involved in many cellular activities including inflammatory response and secretion of gastric acid. It has been shown that IL-1B-31C/T and IL-1B-511C/T polymorphisms are closely related to Gastric cancer \cite{25}. H. pylori contributes to the event of biological process ulcers, gastritis, mucosa-associated lymphatic tissue cancer and viscus cancer, prolonged infection causes chronic inflammation, aerophilic stress and polymer harm \cite{8}. Oxidative stress is defined as an imbalance between free radicals and antioxidants in favor of the oxidants, leading to disruption of redox signaling and molecular damage \cite{9}. Gastro-intestinal tract (GIT) could be a key supply of ROS production. Despite the protecting barrier provided by the animal tissue layer, eaten materials and pathogens will cause inflammation by activating the epithelial tissue, polymorphonuclear neutrophils (PMNs), and macrophages to supply inflammatory cytokines and different mediators that contribute more to aeroophilic stress \cite{10}.

Current study was aimed to study the role of H. pylori infection and IL-1β in pathogenesis of gastritis as well as to study the impact of C-511T (rs16944) polymorphism in the promoter region of the IL-1β gene.

**Subject and Method**

This study included 90 subjects divided into three groups; the first group included 30 patients suffered from gastritis with H. pylori infection, the second group included 30 patients suffered from gastritis without H. pylori infection and the third group included 30 subjects apparently healthy as control group. The age of all subjects was ranged between (30-50) years. The study was carried out from out patients collected from GIT and Hepatology center at Mirjan Medical City in Babylon province, Hilla city, Iraq. Patients were diagnosed clinically and the disease was evaluated by physicians. All samples were collected from 1st, October 2017 till 1st, February 2018. The practical part of the study was performed at the laboratory of Biochemistry Department in Faculty of Medicine/ University of Babylon, Iraq.

**Exclusion criteria:** Subjects who suffered from the followings were excluded from the study: Patients who take any non-steroidal anti-inflammatory drugs (NSAIDs), patients with concurrent inflammatory bowel disease, patients with diabetes, cardiovascular diseases (including coronary artery disease, peripheral vascular disease, heart diseases, hypertension and stroke), and malignancy. In addition, patients with rheumatoid arthritis, patient with any other chronic diseases (metabolic and endocrine) as well as pregnant women and smokers.

**Ethical issues**

The objectives and methodology of this study were explained to all participants in the current study to gain their verbal acceptance. In addition, the study was approved by Research Ethics Committees at College of Medicine/ University of Babylon and at Mirjan Medical City, Hilla City, Iraq.

**Blood collection**

A sample of five mL of blood was obtained from every subject by vein puncture and pushed slowly into 2 tubes (2mL into EDTA tube for genetic study and 3mL into plain tube). Blood inplain tube was allowed to clot at 37°C for 10-15 minutes and centrifuged for about 14000rpm for approximately 10-15 minutes then the sera were divided into four parts in labeled Eppindorf tubes and given a serial number together with the patients names then stored at -20°C until analysis for measurement of Human interleukin 1 beta (IL-1β), Glutathione (GSH), Malondialdehyde (MDA) and total anti-oxidant capacity level (T-AOC), while H. pylori antibody was measured directly before storage.

Body Mass Index (BMI) was calculated from the weight (in kg) divided by the square of height (in m): BMI= Weight (kg) / Square Height (m2).

Assay for detection of H. pylori in serum was performed by H. pylori Antibody Rapid test cassette, while serum Total Antioxidant capacity (TAC) was measured by Spectrophotometric technique. On the other hand, human Interleukin 1β level, serum Malondialdehyde concentration and serum Glutathione concentration were estimated using standard enzyme-linked immune-sorbent assay technology (ELISA) kits.
These kits were provided from Elabscience®/USA and the assay performed depending on the manufacture’s instructions.

**Genotyping analysis**

Genomic DNA Mini Kit (Favorgen, Taiwan) provides an efficient method for extraction of genomic DNA from whole blood. Purity of DNA was assessed by nanodrop device and detection by electrophoresis on 2% agarose gel. IL-1’ gene was amplified by a polymerase chain reaction (PCR) with specific published primers. The forward and reverse primers were show in Table (1).

**Table 1 The forward and reverse primers for IL-1β gene**

<table>
<thead>
<tr>
<th>Primers</th>
<th>Sequence</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1B F</td>
<td>5’-TCCTCAGAGGCTCCTGCAAT-3’</td>
<td>[7]</td>
</tr>
<tr>
<td>IL-1B R</td>
<td>5´-TGTGGGTCTCTACCTTGGTG-3’</td>
<td></td>
</tr>
</tbody>
</table>

The amplification procedure (PCR conditions) was summarize in Table (2).

**Table 2 Amplification conditions of Interleukin 1 Beta gene**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Temperature (°C)</th>
<th>Time</th>
<th>Function</th>
<th>Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>95</td>
<td>3min.</td>
<td>Initial denaturation</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>95</td>
<td>1min.</td>
<td>DNA denaturation</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>60.5</td>
<td>30sec.</td>
<td>Primer annealing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>72</td>
<td>1min.</td>
<td>Template elongation</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>72</td>
<td>7min.</td>
<td>Final elongation</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>-</td>
<td>Incubation</td>
<td>Hold</td>
</tr>
</tbody>
</table>

Gene polymorphisms were detected using Single-Strand Conformation Polymorphism (SSCP) technique (Table 3 and Figure 3).

**Table 3 Haplotypes frequency and odd ratio of interleukin 1β gene in gastritis patients and their healthy controls**

<table>
<thead>
<tr>
<th>Haplotype</th>
<th>Control (%)</th>
<th>Patients (%)</th>
<th>Odd ratio</th>
<th>CI_95%</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0%</td>
<td>1.66%</td>
<td>0.3131</td>
<td>0.0001-0.0374</td>
<td>0.0001</td>
</tr>
<tr>
<td>B</td>
<td>0%</td>
<td>3.33%</td>
<td>0.0025</td>
<td>0.0001-0.0549</td>
<td>0.0001</td>
</tr>
<tr>
<td>C</td>
<td>0%</td>
<td>5%</td>
<td>0.2554</td>
<td>0.0124-5.2541</td>
<td>0.376</td>
</tr>
<tr>
<td>D</td>
<td>64.6%</td>
<td>41.6%</td>
<td>1.9600</td>
<td>0.3573-10.7531</td>
<td>0.4384</td>
</tr>
<tr>
<td>E</td>
<td>36.6%</td>
<td>15%</td>
<td>5.6222</td>
<td>1.5197-20.7998</td>
<td>0.0097</td>
</tr>
</tbody>
</table>

\( \text{CI}_{95\%} \): Confidence interval at 95% level.
Statistical Analysis

Statistical analysis was carried out using SPSS version 20. Continuous variables were presented as (Means±SD). A P value of ≤0.05 was considered significant. Haplotype frequency were determined by a variety of bands between patients and controls.

### Table 4: The mean differences of study variables according to study group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study group</th>
<th>No.</th>
<th>Mean±SE</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>Control</td>
<td>30</td>
<td>37.96 ± 1.21</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>60</td>
<td>38.85 ± 0.83</td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>Control</td>
<td>30</td>
<td>27.93 ± 0.91</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>60</td>
<td>26.88 ± 0.64</td>
<td></td>
</tr>
<tr>
<td>interlukin1β</td>
<td>Control</td>
<td>30</td>
<td>0.10 ± 0.00</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>60</td>
<td>0.10 ± 0.00</td>
<td></td>
</tr>
<tr>
<td>Malondialdehyde</td>
<td>Control</td>
<td>30</td>
<td>1.19 ± 0.12</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>60</td>
<td>1.48 ± 0.05</td>
<td></td>
</tr>
<tr>
<td>Glutathione</td>
<td>Control</td>
<td>30</td>
<td>0.32 ± 0.01</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>60</td>
<td>0.29 ± 0.01</td>
<td></td>
</tr>
<tr>
<td>Total anti-oxidant</td>
<td>Control</td>
<td>30</td>
<td>11.33 ± 2.53</td>
<td>0.51</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>60</td>
<td>13.10 ± 0.91</td>
<td></td>
</tr>
</tbody>
</table>

**Results**

Table 4 showed mean differences of study variables, including age, body mass index, interlukin1β, Malondialdehyde, Glutathione and Total anti-oxidant, according to study group (patients with Gastritis and their healthy controls).

Comparison between Gastritis patients (*H. pylori* positive and *H. pylori* negative) and their healthy controls

Table 5 Serum interleukin 1β level, Malondialdehyde, Glutathione and total Antioxidant of Gastritis and their healthy controls

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Gastritis patients</th>
<th>Controls (n=30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HP negative Mean±SE (n=30)</td>
<td>HP positive Mean±SE (n=30)</td>
<td>Controls Mean±SE (n=30)</td>
</tr>
<tr>
<td>Interlukin1β</td>
<td>0.11±0.01</td>
<td>0.08±0.00</td>
<td>0.10±0.00</td>
</tr>
<tr>
<td>Malondialdehyde</td>
<td>1.58±0.04</td>
<td>1.39±0.88</td>
<td>1.19±0.12</td>
</tr>
<tr>
<td>Glutathione</td>
<td>0.32±0.02</td>
<td>0.26±0.01</td>
<td>0.32±0.01</td>
</tr>
<tr>
<td>Total anti-oxidant</td>
<td>11.35±1.55</td>
<td>14.85±0.87</td>
<td>11.33±2.53</td>
</tr>
</tbody>
</table>

HP: *H. pylori*. SE: Stander error. n: number of subjects within a study group. *: P value for comparison between gastritis with Negative *H. pylori* and controls. **: P value for comparison between gastritis with *H. pylori* positive and controls.
Distribution of patients with gastritis and positive for *H. pylori* infection and gastritis patients and negative for *H. pylori* infection groups according to study variables

**Table 6 Distribution of gastritis patients according to study variables**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>HP negative Mean±SE (n= 30)</th>
<th>HP positive Mean±SE (n= 30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interlukinβ</td>
<td>0.11 ± 0.01</td>
<td>0.08 ± 0.00</td>
<td>0.07</td>
</tr>
<tr>
<td>Malondialdehyde</td>
<td>1.58 ± 0.04</td>
<td>1.39 ± 0.88</td>
<td>0.07</td>
</tr>
<tr>
<td>Glutathione</td>
<td>0.32 ± 0.02</td>
<td>0.26 ± 0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Total anti-oxidant</td>
<td>11.35 ± 1.55</td>
<td>14.85 ± 0.87</td>
<td>0.05</td>
</tr>
</tbody>
</table>

SE: Stander error. -number of subjects within a study group. P value for comparison between gastritis patients who are positive for *H. pylori* and those who are negative for *H. pylori* groups. HP: *H. pylori*.

![Genomic DNA extracted from whole blood](image1)

**Figure 1** Genomic DNA extracted from whole blood. Lanes (1-5): DNA extracted from Gastritis patients, and lanes (6-10): DNA extracted from controls.

![PCR amplification product of IL-1β gene](image2)

**Figure 2** PCR amplification product of IL-1β gene on ethidium bromide-strained Agarose gel (2%), 70 volt for 1 hour. The regions with 70bp are indicative of positive results for IL-1β. Lane (L):100bp DNA ladder. Lanes (1-5) positive results of IL-1β for patients. Lanes (6-11) positive results of IL-1β for controls.
Discussion

There was no significant difference in age between patients and control groups (P-value = 0.55). This age matching helps eliminate differences in parameters that may originate due to the significant variation in age [11]. The value of BMI between patients and control groups was not significantly different (Table 4) and there were no significant difference in interleukin 1β level between gastritis patients and control groups (P-value = 0.64; Table 5). In addition, there was significant decrease in IL-1β level in gastritis patients with H. pylori infection in comparisons with controls.

Current results were not consistent with [12] who indicated an increase in IL-1β in H. pylori infection. The differences may refer to differences in categories of patients groups, stage of disease, type of sample, age of patients, environmental causes and other unknown causes that need further studies. On the other hand, current results demonstrated that there was no significant difference in interleukin 1β between gastritis patients who are positive for H. pylori infection and those who are negative for H. pylori infection groups. Current data were in agreement with previous studies [13,14], but disagreed with [15]. Present findings indicated many significant differences were observed between gastritis patients and controls. Serum MDA increased significantly in gastritis patients when compared with controls. Also, H. pylori-infected individuals had increased blood MDA levels, ROS production and protein carbonyls, oxidatively-damaged DNA and SOD activity in addition to lower vitamin C. Individuals infected with H. pylori are under systemic oxidative stress, higher ROS production in the peripheral blood. However, these individuals were found to be normalized after eradication of H. pylori [16]. Serum GSH and serum TAO increased significantly in patients negative for H. pylori when compared with control groups. TAO increase d significantly in positive H. pylori when compared with negative H. pylori patients. The results of present study included gene polymorphism of IL-1β. In gastritis patients compared with healthy control, Gene polymorphisms were detected using PCR-SSCP technique because it can give indicators about haplotype secondary structure of the amplified segments of the gene. The results of haplotype polymorphism in IL-1β gene showed five patterns of haplotypes labeled (A, B, C, D and E) as shown in Figure (3) and most abundant haplotypes were D and E among patients groups (41.6%, 15%) and in control groups (64.6%, 36.6%), respectively. On the other hand, there were three patterns (A, B and E) Polymorphisms showed highly significant differences between patients and controls; whereas other patterns did not show any significant (P>0.05) variations between studied groups.

Conclusion

In Iraqi population, the gene polymorphisms with D haplotype were associated with chronic gastritis and mainly development of H. pylori--infected individuals. No correlation was found between IL-1β -511 gene polymorphisms in any gastric disease with A,B and C haplotypes. Gastritis with H. pylori infection plays an important role in development of oxidative stress.

Ethical Clearance: The study was approved by the Research Ethics Committee at at College of Medicine/University of Babylon and at Mirjan Medical City, Hilla City, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

References

2- Borghini R, Donato G, Marino M, Casale R, Picarelli A. Culture of gastric biopsies in celiac disease and its relationship with gastritis and Helicobacter


Evaluation of Serum Cytokines IL-12, 17 and 22 Levels in Patients with Brain Tumors

Ahmed M.B. AL-Sherify; Mayada Farhan Darwesh, Musa Nima Mezher
1College of Science, University of Kufa, AL-Najaf, Iraq

Abstract

Background: There are over 120 brain tumor types and they were classified according to World Health Organization. Previously, attempts were made regarding chemosensitivity testing and molecular biomarkers methods were used as techniques during the management of different types of malignant tumors in routine clinical practice, especially in neuropathology. Current study was aimed to evaluate some immune-markers in Iraqi patients by (ELISA) to assess the different levels of IL-12, IL-17 and IL-22 to illustrate ability of tumor in immune-modulatory activity to increase the progression of disease. Also, it was hoped that these markers can be used as indicators for rapid identification of novel brain tumor in patients, directly from their sera samples in vitro as chemo-sensitivity assay. Methodology: Current study involved 68 Iraqi brain tumor patients (30 Glioma; 14Glioblastoma Multi form (GBM), 10 Astrocytomas, 4 Ependymomas and 2 Oligodendrogliomas) 24 Meningiomas, 5 Schwannoma and other 8 different tumor types were investigated for serum level of IL-12, IL-17 and IL-22 by (ELISA) assay. Control samples were also enrolled in the study, including 30 healthy subjects (18 males and 12 females). Results: The present study illustrated that IL-12 mean serum level decreased to (33.9±9.9pg/ml) compared with its level in controls (47.68±3.5pg/ml). Also, there was a higher reduction in its level in Gliomas, Meningioma and Schwannoma (30.55±10.8, 37.6±8.4 and 33.8±8.7pg/ml, respectively). IL-17 serum level was highly significantly increased with a mean level (42.3±9.7pg/ml) as compared with control level (10.46±3.5pg/ml). In Gliomas, its serum level was (67.8±11.8 pg/ml) compared with its level in Meningioma and Schwannoma (33.8±3.4 and 27±7.7pg/ml, respectively). IL-22 showed significant increase (67±20pg/ml) in comparison with control level (22±5pg/ml). In Gliomas its level was (93±3pg/ml) compared with its level in Meningioma, schwannoma (60±2.6 and 77.78±7.4pg/ml, respectively). Conclusions: This study showed that all brain tumor types patients had increased circulating serum levels of IL-17 and IL-22, while decreased of IL-12. These data indicated that brain tumors might have a systemic effect on the immune system. The data also suggested a possible role of some Interleukins in pathogenesis of brain tumor. IL-12, IL-17 and IL-22 may also be a potential biomarkers and/or immunotherapeutic targets in some brain tumor types.

Keywords: Brain tumor, Cytokines , IL-12 , IL-17 , IL-22, Biomarker, Gliomas.

Introduction

Cancer is a generic term that refers to an extremely complex spectrum of diseases in which cells abnormally undergo uncontrolled and sustained chronic proliferation and growth as well as they are able to invade other tissues [1]. In spite of the advances in cancer field during the past decade, treatments are still insufficient and the survival of tumor patients remains at a figure of 14.6 months from the diagnosis for (GBM) (or little more for some other types) due to different factors [2]. There are over 120 brain tumor types and they were classified according to World Health Organization [3].

Previously, attempts were made regarding chemosensitivity testing and molecular biomarkers methods were used as techniques during the management of different types of malignant tumors in routine clinical practice, especially in neuropathology, then they evolved in using varient molecular markers which may highlight the tumor biology [4]. All these attempts remain dismal so far and very few of them have been used in clinical
practice. If these attempts are achieved, they will be very useful in demonstrating the neoplastic changes at a molecular level, facilitate the diagnosis and would be used as prognostic factors for patients’ survival and considered more advanced techniques that may be used instead of anatomical techniques.

Amongst the most promising ones for clinical use are cytokines and angiogenesis factors. Cytokines are low molecular-weight soluble protein messengers that are involved in all aspects of immunity and may be regarded as hormones of the immune system. These molecules can be secreted by various cells and act as signals between cells to regulate the immune responses. They have a variety of functions that facilitate immune effector mechanisms in cancer immunity and their mechanisms may be either growth stimulation or inhibition of pre-malignant or malignant cells by acquired and/or innate immunity.

Current study was aimed to evaluate some immune-markers in Iraqi patients by (ELISA) to assess the different levels of IL-12, IL-17 and IL-22 to illustrate ability of tumor in immune-modulatory activity to increase the progression of disease. Also, it was hoped that these markers can be used as indicators for rapid identification of novel brain tumor in patients, directly from their sera samples as a chemo-sensitivity assay.

Subjects and Method

Subjects: The study was approved by the Research Ethics Committee at Ministry of Health, Iraq. Current study involved 68 patients (60% males and 40% females) with age range of 2-85 years. The study also recruited 30 apparently healthy, cancer-free adults as controls (18 males and 12 females) with age range of 24-44 years.

Specimen Collection: From each participant, 3ml of venous blood were collected pre-surgical operation and dispensed in a plain tube for the collection of serum. Plasma was separated by centrifugation. The serum was distributed into aliquots (0.25ml each) and kept in the freezer (at -20°C) until assessment of cytokines by ELASA assay. As shown in Table (1) most of micro-/macro-environmental factors of patients were presented (state, gender, smoking, family history of malignancy, education, employment, health state (having secondary infection)). Serum levels of cytokines: Levels of IL-12, IL-17 and IL-22 were assessed in the sera by means of Sandwich-ELISA kit as a method, by using ready-used kits and the instructions of manufacturers (Elabscience (ALISA) KIT. USA) were followed. Statistical analysis: Serum levels of cytokines were statistically analyzed using Statistical Package for Social Sciences (SPSS; version 13). Data were presented as Mean±Standard Error (S.E.) and differences between means were assessed by analysis of variance (ANOVA) followed by Duncan’s test. The difference was considered significant when the probability (P) value was ≤0.05.

Results and Discussion

Demographic data of participants

**Table 1: Risk factors in 68 tested patients with brain tumor**

<table>
<thead>
<tr>
<th>Risk Factor Group</th>
<th>Males</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Gender</td>
<td>41</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td>2- Residency</td>
<td>Rural</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>48</td>
</tr>
<tr>
<td>3- Marital status</td>
<td>Married</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Unmarried</td>
<td>25</td>
</tr>
<tr>
<td>4- Smoking history</td>
<td>Yes</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>52</td>
</tr>
<tr>
<td>5- Educational level</td>
<td>Higher</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Less</td>
<td>59</td>
</tr>
<tr>
<td>6- Employment</td>
<td>Employed</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Unemployed</td>
<td>40</td>
</tr>
</tbody>
</table>
The results revealed that patients within the age group ≤44 years old had the highest percentage (58%), while the lowest percentage was those within the age group (65-85) years old who represented 10% of the total number of patients (Table 1).

Most of macro-environmental factors were not risk factors and micro-environmental parameters may be considered significant risk factors. Also, tumor location is prevalent among these age groups, similar to the results of. Tumor initiation and progression is a very complex process involving several agents such as immunological, mutations and micro-/ macro-environmental factors. On the other hand, suggested that immune alteration of inflammatory mediators may also be affected in brain tumor. In contrast, reported that viral infections of beta-herpes viruses were the most candidate agents of brain tumors and other risk factors may activate them. However, did not consider that the micro environmental factors as risk factors. Within the tumor environment, all or some of these factors or mediators may be responsible for tumor invasion, angiogenesis, cellular proliferation and suppression of certain immune functions by anyways.

**Serum levels of IL-12, IL-17 and IL-22**

Table 2 Serum levels of IL-12, IL-17 and IL-22 for study participants.

<table>
<thead>
<tr>
<th>Cytokine</th>
<th>Controls (n=30) Mean±SE</th>
<th>Brain Tumor patients (n= 59). Mean±SE</th>
<th>Serum cytokines levels in braintumor patients according to type of brain tumor (n= 59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL – 12</td>
<td>47.68±3.5</td>
<td>33.9±9.9</td>
<td>*Gliomas (n= 30) 30.55± 10.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meningioma (n= 24) 37.6±8.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Schwannoma (n= 5) 33.8±8.7</td>
</tr>
<tr>
<td>IL – 17</td>
<td>10.46±3.5</td>
<td>42.3±9.7</td>
<td>Gliomas (n= 30) 37.8±11.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meningioma (n= 24) 33.8±11.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Schwannoma (n= 5) 27.2±7.7</td>
</tr>
<tr>
<td>IL – 22</td>
<td>22.9±5.9</td>
<td>76.9±20.5</td>
<td>Gliomas (n= 30) 93.5±3.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Meningioma (n= 24) 60.6±2.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Schwannoma (n= 5) 77.7±7.4</td>
</tr>
</tbody>
</table>

*: These included 14 Glioblastoma Multi form (GBM), 10 Astrocytomas, 4 Ependymomas and 2 Oligodendrogliomas.
The present study illustrated that interleukin-12 serum level was decreased to (33.9±9.9pg/ml) compared with its level in the serum of healthy controls (47.68±3.5pg/ml) (Table 2 and Figure 1).

Also, results of current study showed that there was strong reduction in serum level of IL-12 in Gliomas, Meningioma and Schwannoma (30.55±10.8, 37.6±8.4 and 33.8±8.7pg/ml, respectively, Table 2). In case of IL-17, there was highly significant increase in its serum level (42.3±9.7pg/ml) as compared with controls (10.46±3.5pg/ml). In Gliomas, serum level of IL-17 was (67.8±11.8pg/ml) compared with its levels in Meningioma and Schwannoma (33.8±3.4 and 27±7.7pg/ml, respectively, Table 2).

Regarding IL-22, these was significant in its serum level (67±20pg/ml) in comparison with its level in controls (22±5pg/ml). In Gliomas, serum level of IL-22 was (93±3pg/ml) compared with Meningioma and schwannoma levels (60±2.6 and 77.78±7.4pg/ml, respectively, Table 2). Also, results of current revealed significant variation between glioma patients and those with other brain tumor types.

Figure 1 Serum levels (pg/ml) of IL-12, IL-17 and IL-22 controls and patients with different types of brain types.

The present study highlighted the importance of IL-12, IL-17 and IL-22 in pathogenesis of brain tumor as some cytokines showed significantly increased or decreased serum levels in the patients.

IL-12 is a key pro-inflammatory cytokine in response to infections, then emerged as a potent inducer of antitumor immunity with multiple biologic effects on peripheral blood lymphocytes [15]. Moreover, [16] reported that the level of IL-12 significantly reduced in Meningioma and Glioplastoma patients compared with control group. Furthermore, [17] reported a link between the immune system and brain tumor, and revealed that the T-lymphocyte infiltrations have been observed in the tumor regions of certain Glioma patients. In Iraq, the association between serum levels of cytokines and the development of Glioma and Meningioma was confirmed in Iraqi population. Finally, [18] observed that IL-12 p40 deficiency resulted in earlier appearance of 3-methylcholanthrene (MCA)-induced sarcomas as compared to wild-type mice.

Interleukin-17 is type I transmembrane protein that is produced by activated T cells [19] and is a pleiotropic pro-inflammatory cytokine that promotes T cell priming and enhances endothelial, epithelial and fibroblastic cells to produce numerous pro-inflammatory mediators involving IL-6, IL-1, TNF-α and chemokines [20]. Also, [21] observed elevated levels of IL-17A in bladder cancer patients.

IL22 is a major cytokine member of the IL10 cytokine super family, it is secreted by (Th17) and exhibits potent proinflammatory properties [15]. In contrast, IL22 was observed to have an antiapoptosis effect in lung cancer, acting in an autocrine manner and drive tumor progression via IL22 R1 signaling in large cell lymphoma [21]. Similarly, serum IL-22 levels were significantly higher in patients than in controls and no differences were observed between patients with Meningiomas, Disgerminomas and Macroadenomas of pituitary gland [22]. Also, [23] reported increased levels of IL-22 in high grade tumors.

The low percentage of IL-12 and high percentage of both IL-17 and IL-22 expression by brain tumor cells may be in favor of tumor progression. In agreement with the present results and accordingly, it was considered as an important factor produced by malignant brain tumors involved in the local immunosuppression [24]. Such cytokine has been reported to be secreted by glioma cells [25], and functionally it impairs T cells activity and responsible for the development of immuno-tolerizing Treg cells [26] [15].

Conclusions

This study showed that all brain tumor types patients had increased circulating serum levels of IL-17 and IL-22, while decreased of IL-12. These data indicated that brain tumors might have a systemic effect on the immune system. The data also suggested a possible role of some Interleukins in pathogenesis of brain tumor. IL-12, IL-17 and IL-22 may also be a potential biomarkers and/or
immunotherapeutic targets in some brain tumor types.

**Recommendations**

The IL-12, IL-17 and IL-22 serum levels have to be revisited, with other types of brain tumors, especially if the grading system of tumor is considered. Monitoring the changing in the neoplastic and immune chemokines in patients and developing chemo-sensitivity tests and molecular biomarkers methods which may highlight the tumor biology and facilitate the diagnosis as well as contribute to the prognosis of the tumor by more advanced techniques that may be used instead of the anatomical technique.

**Ethical Clearance:** The study was approved by the Research Ethics Committee at Ministry of Health, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**References**


2- Negin B. Cytokine Control of Gioma Adhesion and Migration. Theses . California State University-San Bernardino; 2014.


4- Lekka E. MalignantGliomsChemosensitivityTestingand Biomarker. A doktorathesis ofMedicin ,Central Lancashire University In Collaboration with Lancashire Teaching Hospitals NHS Trust; 2012.

5- Shara P. Persistent Infection with Human Herpesvirus-6 in Patients with an Inherited Form of the Virus : A Newly Described Disease. University of South Florida, spantry@health.usf.edu. Graduate Theses and Dissertations 2013.

6- Olesja F. Towards Understanding of Human Cytomegalovirus in Glioblastoma. From the Department of Medicine, THESIS FOR DOCTORAL DEGREE (Ph.D.) SolnaKarolinskaInstitutet, Stockholm, Sweden; 2016.


14- Wagemakers M. Angiogenesis and Angiopioetins in human gliomas.


17- Lohr J, Ratliff T, Huppertz A, Ge Y. Effector T-cell infiltration positively impacts survival of glioblastoma patients and is impaired by tumor-derived TGF-beta. Clin Cancer Res 2011;17(13);


22- Doroudchi M, Zahra G, Mahyar M, Hossein G. Elevated Serum IL-17A but not IL-6 in Glioma Versus Meningioma and Schwannoma.


Association between Two Different Methods for Determining Facial Types in Iraqi adults

Haider M. A. Ahmed

Department of Orthodontics, College of Dentistry, University of Baghdad, Iraq

Abstract

This study is aimed to determine the association between two different methods for determining the facial types in a sample of Iraqi adults with normal class I dental and skeletal relations.

Eighty dental students (33 males and 47 females) agreed and signed a consent form to participate in this study. Standardized frontal and profile photographs were taken for each student then analyzed using AutoCAD program (2016). Facial types were determined using two different methods, facial index method and facial taper angle method. Association between these two methods was determined by Chi-square test.

Keywords: Iraqi adults; dental students; facial index method; and taper angle method

Introduction

Faces would display some common features, but they differ from each other as they differ from the rest of us\(^{(1)}\). One of the most important objectives of orthodontic treatment is to improve facial appearance and that’s why we should be able to identify good looking faces\(^{(2)}\).

The first method to determine the facial types is determined by calculating the ratio between facial width (interzygomatic distance) and the anterior facial height\(^{(3,10,11)}\).

The second method is to calculate the facial taper angle which is formed by extending the right and the left lines connecting the most lateral points of the orbits and the junction of the upper and lower lips at the corner of the mouth\(^{(9)}\).

In this study, the relation between the two different methods of assessing facial types was tested in a sample of Iraqi adults with normal skeletal and dental relations.

Materials and Method

Sample

Out of 100 examined students from the College of Dentistry, University of Baghdad, only eighty subjects (33 males and 47 females) met the inclusion criteria.

Inclusion criteria

All of the subjects were Iraqi Arab in origin.

The age ranged between 19-23 years.

All of them had normal skeletal, molars, canines and incisors relationships.

All of them had complete permanent dentition regardless the third molars.

None of the subjects had any history of previous oro-facial surgery, orthodontic treatment or craniofacial disorder, such as cleft palate.

History and clinical examination\(^{(12)}\)

Each subject was asked to sit on the dental chair and a case sheet were filled about the name, age, gender and origin. Medical history, the history of facial trauma, dental history and orthodontic treatment. Then they were asked to look forward horizontally in the natural head position for clinical examination (extra-orally and intra-orally) to check their fulfillment of the required sample selection.

Photographic analysis

Frontal and lateral view photograph was taken for each student in a cephalostat based head position using digital camera (Sony Cyber Shot H 50, 9.1Mega pixels, DOI Number: 10.5958/0976-5506.2019.00943.4
The camera was fixed in position and adjusted in height to be at the level of subject ‘eyes with a height adjustable tripod. The distance from the camera to the subject was fixed at a distance of about 1.01m measured from the tripod’s column to the ear rods, the ear rods fit in the external auditory meatus in order to avoid the forward, backward, and tilting of the subject head (Cephalostat based head position). In the frontal view the subject was asked to look at the center of the lens of the camera, while in the profile view the subject were asked to look to a distant mirror which is placed in front of his/her face. To eliminate the problem of shadows on the submental region the subject held a small rectangular reflecting panel positioned horizontally against the chest just under collar bone. The blue background, 0.95 m width and 1.10 m length was made of a piece of cloth; a ruler was placed near the subject face to correct the magnification\(^4, 13\). The Frankfort horizontal plane was parallel to the floor\(^1, 14\).

Every frontal and profile photograph was analyzed using AutoCAD program (2016) to calculate the angular and linear measurements. The angle was measured directly as they were not affected by magnification, while the linear measurements were divided by scale for each picture to overcome the magnification.

Photographic Landmarks, linear and angular Measurements

Photographic Landmarks

Point n (soft tissue nasion): The point in the midline of both the nasal root and the nasofrontal suture, always above the line that connects the two inner canthi identical to bony nasion\(^5\).

Point gnathion (gn): correspond to skeletal gnathion which is the most anterior and inferior point of the soft tissue chin\(^6\).

Point zygoin (zyg), the most prominent point on the cheek area beneath the outer canthus and slightly medial the vertical line passing through it\(^5\).

Point End, Ene, the right and left internal corner of the eye\(^15\).

Point Abd ,Abe, the right and left corner of the mouth\(^15\).

Linear measurements

Interzygomatic distance (izd): it is the transverse distance between soft tissue zygoin on both sides\(^9\).

Anterior facial height (n-gn): it is the vertical distance between soft tissue nasion and gnathion\(^9\).

Facial type (Figure 1) was determined by calculating the ratio between facial width (izd) and anterior facial height (n-gn)\(^3\).

Euryprosopic (IzD/n-gn) the facial index is > 0.93

Mesoprosopic (IzD/n-gn) the facial index is \(\leq0.93\) and \(\geq0.83\)

Leptoprosopic (IzD/n-gn) the facial index is < 0.83

Angular Measurement

Facial taper angel (Figure 2) was formed by extending the right and left lines connecting the most lateral points of the orbits and the junction of the upper and lower lip at the corner of the mouth. The intersection will form an angel that mean value is 45 degree \(\pm 5\) degrees, larger values of this angel indicates wide face, more square faces, whereas lower ones indicates a longer narrower faces\(^9\).
Statistical Analyses

All the data of the sample were subjected to computerized statistical analyses using SPSS version 24 computer program. The statistical analyses included:

Descriptive Statistics (Frequency and percentages).

Inferential Statistics (Chi-square to find out the association between the two methods).

<table>
<thead>
<tr>
<th></th>
<th>NS</th>
<th>P &gt; 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-significant</td>
<td>NS</td>
<td>P &gt; 0.05</td>
</tr>
<tr>
<td>Significant</td>
<td>S</td>
<td>0.05 ≥ P &gt; 0.01</td>
</tr>
<tr>
<td>Highly significant</td>
<td>HS</td>
<td>P ≤ 0.01</td>
</tr>
</tbody>
</table>

In the statistical evaluation, the following levels of significance are used:

Results

Table 1 show that in facial taper angle method the Euryprosopic facial type has the highest percentage in both genders and the total sample followed by Leptoprosopic facial type while the Mesoprosopic facial type has the least percentage. In females the Leptoprosopic and Mesoprosopic facial types are equal.

In the facial index method the Mesoprosopic facial type has the higher percentage among the sample followed by Euryprosopic facial type while the Leptoprosopic facial type is the least in both genders and the total sample.

There is a high significant association (p-value 0.000) between the two methods of facial type determination.

Table 1. The frequency distributions and percentage of facial types in the two methods and their association in both genders and total sample.

Discussion

Changes that occur due to different treatment mechanics are not the same for each person due to that fact that they differ in morphology and facial type therefore it’s necessary to figure out the individual person by describing his basic facial type to draw up an effective treatment for his malocclusion(16).

Facial type is related to the craniofacial complex growth which is contributed to malocclusion; several varieties may be present in facial form due to age and genders(17, 18).

Farakas and Munro in 1987 and Ramadan in 2001 used indirect method of measuring photographic measurements by using photographic print and ruler that resulted in error since these measurements are made on minimized images of a large objects, in that way any minor error will result in a false result after calculating magnification, while in this study anatomical landmarks were enlarged and calculated the actual size using a
Determination of the facial type using facial index method of calculating the ratio between facial width \((izd)\) and anterior facial height \((n-gn)\)\(^{(3)}\) indicates that Mesoprosopic facial type is the dominate type in both genders and the total sample this may due to the fact that this method utilize linear measurements and since the facial index is the result of dividing the facial width \((izd)\) on the facial height \((n-gn)\) that make the faces Mesoprosopic which is the neutral facial type lies between the Euryprosopic and Leptoprosopic types\(^{(3,10)}\) which agrees with Bishara and Jacobsen in 1995 and Ramadan in 2001\(^{(7,8)}\).

Determination of the facial type using facial taper angle indicates that Euryprosopic facial type is the dominant type since this method depends on angular measurements and the Euryprosopic faces characterized by wider set of eyes\(^{(3,10)}\) that increase the taper angel and resulting in wider faces which disagree with Bishara and Jacobsen in 1995\(^{(7)}\).

Chi square test shows a highly association between the two methods of facial type determination which makes using either way is the same and in my opinion using facial taper angel is the best since it depends on angular measurements not on linear measurements of facial index method.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**

Assessment of the Knowledge Regarding Risk Factors and Preventive Measures of Chronic Diseases among Students of Southern Technical University in Basrah

Majid A. Maatook¹, Rajaa Ahmed Mahmoud²

¹Health and Medical Technology College, Basrah, Iraq, ²Directorate of Health, Basrah, Iraq

Abstract

Chronic “non-communicable” disease is a term that describes any disturbance in the function of the body structure and metabolism that results in chronic change of the individual’s usual life style. However, despite knowing the great importance of knowing the risk factors of chronic diseases, very little information is known about the awareness level of university students on this issue.

The purpose of this study is to assess students’ knowledge about the risk factors and preventive measures of chronic diseases among students of Southern Technical University in Basrah.

It’s a cross-sectional study involved 350 college students from the Southern Technical University using a questionnaire approved Basrah Health Directorate/Research Unit/Training Department.

Age and sex were the most identified risk factors by the students (94.3% and 89.1% respectively). While the level of education and over-consumption of alcohol were found by the study to be among the least identified factors (24.9% and 21.7% respectively). Furthermore, on studying the knowledge of the study sample on the preventive measures of chronic diseases at the individual level, maintaining healthy weight was most identified preventive measure followed by avoiding smoking and eating health food (66.3%, 64.3% and 60% respectively).

For the overall knowledge of the Southern Technical University students regarding risk factors of chronic diseases, the study found that only one third of the students knows more than 50% of the total risk factors included in the study.

A poor overall knowledge regarding the risk factors of chronic diseases was found among the students of Southern Technical University in Basrah. That’s why a specified educational program is highly recommended by the present study targeting the students of Southern Technical University in Basrah.

Keywords: Chronic Diseases; Risk Factors; Basrah

Introduction

Chronic “non-communicable” disease is a term that describes any disturbance in the function of the body structure and metabolism that results in chronic change of the individual’s usual life style⁹.

According to the World Health Organization, chronic diseases are the causal factor of 60% of the total global deaths (³). A risk factor to a chronic disease on the other hand, is any factor, or exposure that rises the likelihood of causing a long-term sickness or injury (⁴).

Some studies reveals that having a risk factor for a chronic disease, is considered by the individual as a real life threat, and “the greater the perceived threat, the more likely an individual will change his/her behavior”⁹⁶. Nevertheless, being unaware of such a risk factor can impede having an an action to control/prevent it⁹.
Hindering a risk factor of a chronic disease therefore can result in a missed number of cases within the population and consequently might present lately as advanced and complicated cases.

In India, which doesn’t differ much than the other developing countries, youth and students are considered to be “an age of transformation” that are specifically well known to have practice some risky behaviors that increase the possibility of having chronic non communicable diseases.

Therefore targeting this age group of the population with special awareness programs is a mandatory preventive and control strategy that countries should focus on.

Yet, increasing awareness of communities regarding these risk factors plays a bigger role in preventing future complications and consequently decreasing the morbidity and mortality on a wider population level.

However, despite knowing the great importance of awareness activities regarding chronic diseases risk factors, very little information is known about the awareness level of university students on this issue.

**Materials and Method**

Study design and sampling methodology: The study is a cross-sectional one that took place during March-June 2018. 350 college students from the Southern Technical University were included randomly with the assurance of involving both genders in replying the questionnaire questions.

All of the included students were informed about the aim of the study and an informed consent was ensured for agreeing to participate.

A questionnaire was used after approval from Basrah Health Directorate/ Research Unit/Training Department. Questions included were selected in a way that can assess the knowledge of students regarding risk factors for chronic diseases such as stroke, diabetes and hypertension.

Risk factors for chronic diseases were chosen in the questionnaire according to the World Health Report 2010 so that it can capture risk factors according to the following classification:

**Individual related factors:**
- Background risk factors: age, sex, level of education and genetic composition;
- Behavioural risk factors: smoking, unhealthy diet, Excess alcohol drinking and physical inactivity.
- Intermediate risk factors, such as elevated blood lipids, diabetes, high blood pressure and overweight/obesity.

**Population related factors:**
- Social and economic conditions: poverty and unemployment.
- Environment, such as climate or air pollution;
- Cultural: practices, norms and values

Accordingly, the following factors were included in the questionnaire:
- Age
- Sex
- Level of Education
- Genetic causes
- Poverty
- Employment status
- Smoking
- Excess consumption of alcohol
- High blood pressure (or hypertension)
- Physical inactivity
- High cholesterol
- overweight/obesity
- Unhealthy diet
- High blood glucose
- Environmental pollution
- Cultural practices, norms and values

An overall knowledge of the risk factors was measured as how many students knows 50% of the risk factors or more(8 risk factor or more out of the 16 included in the questionnaire).

**Data entry/Analysis:**

For the data entry and analysis of the study, Microsoft Excel 2010 was used.
Results

Figure 1 shows that the study sample were approximately equal between male and females students.

Age and sex were the most identified risk factors by the students (94.3% and 89.1% respectively). While the level of education and over-consumption of alcohol were found by the study to be among the least identified factors (24.9% and 21.7% respectively). (Figure 2).

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>330</td>
<td>94.3</td>
</tr>
<tr>
<td>Sex</td>
<td>312</td>
<td>89.1</td>
</tr>
<tr>
<td>Environmental pollution</td>
<td>263</td>
<td>75.1</td>
</tr>
<tr>
<td>Overweight/obesity</td>
<td>235</td>
<td>67.1</td>
</tr>
<tr>
<td>Smoking</td>
<td>225</td>
<td>64.3</td>
</tr>
<tr>
<td>Unhealthy diet</td>
<td>207</td>
<td>59.1</td>
</tr>
<tr>
<td>Genetic causes</td>
<td>203</td>
<td>58.0</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>181</td>
<td>51.7</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>178</td>
<td>50.9</td>
</tr>
<tr>
<td>High blood glucose</td>
<td>178</td>
<td>50.9</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>104</td>
<td>29.7</td>
</tr>
<tr>
<td>Level of Education</td>
<td>87</td>
<td>24.9</td>
</tr>
<tr>
<td>Cultural</td>
<td>85</td>
<td>24.3</td>
</tr>
<tr>
<td>Excess alcohol</td>
<td>76</td>
<td>21.7</td>
</tr>
<tr>
<td>Poverty</td>
<td>55</td>
<td>15.7</td>
</tr>
<tr>
<td>Employment status</td>
<td>24</td>
<td>6.9</td>
</tr>
</tbody>
</table>

Table 2: Knowledge of Students about Risk Factors of Chronic Diseases (%)

Among other risk factors of chronic diseases found by the present study (as shown in table 1) are: environmental pollution, overweight/obesity, smoking, unhealthy diet and genetic causes (75.1%, 67.1%, 64.3%, 59.1% and 58% respectively).

Table 2 represents the knowledge of risk factors and its distribution according to gender among the study respondents. It was noted that Sex was the most identified risk factors by the male respondents (71.2%) followed by excess consumption of alcohol (59.2%), while the level of education was identified in 71.1% of the female respondents followed by unhealthy diet (79.1%).
Table 2: Knowledge of Risk Factors according to Gender of respondents (%)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td></td>
<td>No. (%)</td>
<td></td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>167 (50.6)</td>
<td></td>
<td>163 (49.4)</td>
<td></td>
<td>330 (94.3)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>222 (71.2)</td>
<td></td>
<td>90 (28.8)</td>
<td></td>
<td>312 (89.1)</td>
<td></td>
</tr>
<tr>
<td>Environmental pollution</td>
<td>123 (46.8)</td>
<td></td>
<td>140 (53.2)</td>
<td></td>
<td>263 (75.1)</td>
<td></td>
</tr>
<tr>
<td>overweight/obesity</td>
<td>110 (46.8)</td>
<td></td>
<td>125 (53.2)</td>
<td></td>
<td>235 (67.1)</td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td>125 (55.6)</td>
<td></td>
<td>100 (44.4)</td>
<td></td>
<td>225 (64.3)</td>
<td></td>
</tr>
<tr>
<td>Unhealthy diet</td>
<td>64 (30.9)</td>
<td></td>
<td>143 (69.1)</td>
<td></td>
<td>207 (59.1)</td>
<td></td>
</tr>
<tr>
<td>Genetic causes</td>
<td>106 (52.2)</td>
<td></td>
<td>97 (47.8)</td>
<td></td>
<td>203 (58.0)</td>
<td></td>
</tr>
<tr>
<td>High blood pressure</td>
<td>72 (39.8)</td>
<td></td>
<td>109 (60.2)</td>
<td></td>
<td>181 (51.7)</td>
<td></td>
</tr>
<tr>
<td>High cholesterol</td>
<td>94 (52.8)</td>
<td></td>
<td>84 (47.2)</td>
<td></td>
<td>178 (50.9)</td>
<td></td>
</tr>
<tr>
<td>High blood glucose</td>
<td>81 (45.5)</td>
<td></td>
<td>97 (54.5)</td>
<td></td>
<td>178 (50.9)</td>
<td></td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>42 (40.4)</td>
<td></td>
<td>62 (59.6)</td>
<td></td>
<td>104 (29.7)</td>
<td></td>
</tr>
<tr>
<td>Level of Education</td>
<td>26 (29.9)</td>
<td></td>
<td>61 (70.1)</td>
<td></td>
<td>87 (24.9)</td>
<td></td>
</tr>
<tr>
<td>Cultural</td>
<td>31 (36.5)</td>
<td></td>
<td>54 (63.5)</td>
<td></td>
<td>85 (24.3)</td>
<td></td>
</tr>
<tr>
<td>Excess alcohol</td>
<td>45 (59.2)</td>
<td></td>
<td>31 (40.8)</td>
<td></td>
<td>76 (21.7)</td>
<td></td>
</tr>
<tr>
<td>Poverty</td>
<td>28 (50.9)</td>
<td></td>
<td>27 (50.9)</td>
<td></td>
<td>55 (15.7)</td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>13 (54.2)</td>
<td></td>
<td>11 (45.8)</td>
<td></td>
<td>24 (6.9)</td>
<td></td>
</tr>
</tbody>
</table>

On studying the knowledge of the study sample on the preventive measures of chronic diseases at the individual level, maintaining healthy weight was most identified measure followed by avoiding smoking and eating health food (66.3%, 64.3% and 60% respectively). (Figure 3)

On the other hand, at the community level, the present study found that students knows more about increasing green areas/gardens (62.9%) and implementing mass media campaigns (58.3%). (Figure 4)

On assessing the overall knowledge of the Southern Technical University students regarding risk factors of chronic diseases, the present study found that only one third of the students knows more than 50% of the total risk factors included in the study (Figure 5).
Discussion

Awareness of university students about the risk factors of chronic diseases is a crucial element in expanding this knowledge throughout the whole community as they will form the families they will be part of in the future.

In this present study, poor overall knowledge was found among Southern Technical students in Basrah regarding the risk factors of chronic diseases.

In a cross-sectional study done to assess the knowledge regarding chronic diseases among 634 students aged 17-19 years in Sri Lanka, poor level of knowledge was found specially about unhealthy lifestyle practices and its relation with chronic non communicable diseases(14).

A similar result was also found in other studies. One of these studies was done to assess awareness level of first year medical students in Karnataka, India about the risk factors of Cardio Vascular diseases(15). And also in another study involving students at Arizona State University, USA(16).

The present study confirmed a higher level of knowledge among female students compared to that of male students specially in relation to the unhealthy diet and the level of education as risk factors to chronic diseases.

Better knowledge about the risk factors of chronic diseases (specifically for Diabetes Mellitus) was also found among female in a cross sectional study done in Brazil(17).

A similar result was also found in another descriptive study conducted in Sulaimaniya city – Iraq during 2015, female knowledge was also found to be higher than male regarding risk factors of hypertension disease(18).

On the other hand, a third study aiming to assess the knowledge about diabetes among the males and females in rural population of India, found that both Males and females awareness level was poor with no gender difference observed regarding the knowledge of the disease(19).

In regards to studying the knowledge of the study sample on the preventive measures of chronic diseases at the individual level, maintaining healthy weight in addition to avoiding smoking and eating healthy were found by the present study as the most identified measures. These results can be compared with a cross-sectional study that was conducted in China during 2011, which revealed that eating healthy food was the most identified preventive measure among the study sample followed by decreasing smoking and drinking(20).

Conclusion

A poor overall knowledge regarding the risk factors of chronic diseases was found among the students of Southern Technical University in Basrah. Age and sex were the most identified risk factors, while the level of education and over-consumption of alcohol were found to be among the least identified factors. The students identified maintaining healthy weight, avoiding smoking and eating health food as the main preventive measures for chronic diseases. A specified educational program is highly recommended by the present study targeting the students of Southern Technical University in Basrah.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


in July 2018 at: http://apps.who.int/iris/bitstream/handle/10665/42789/9241562439.pdf;jsessionid=A517C0BD8CE71BB6155E15 A62434BA03?sequence=1


Histological Evaluation of Dental Pulp Response to Collagen with and without Laser Therapy

Ahmed D. N. Al-Agele, Ban Abdul Ghani Jamil

College of Dentistry, University of Babylon, Iraq

Abstract

New tissue formation in the pulp chamber can be observed after adequate infection control and the formation of a blood clot. Low-power lasers have been successfully used in dental practice, and it is known that wound healing is accelerated by their irradiation. Collagen has a potent hemostatic property and ability to aggregate platelets, that facilitates wound maturation by it is chemotactic for fibroblasts and improves their migration and attachment through its fibrillar structure. This property may enhance cell migration into the space between collagen membrane and the pulp wound.

The study was conducted to evaluate pulp response to direct capping with collagen with and without laser exposure by histological and histomorphometric analysis.

Direct pulp capping procedure was performed on 40 rabbit incisors which were divided into control (10 teeth capped by mineral trioxide aggregate) and experimental groups (10 teeth exposed to laser and sealed by MTA), (10 teeth capped by collagen), (last 10 teeth capped by collagen and exposed to laser) for 1 and 4 weeks periods.

Histological findings showed variable response of pulp tissue to the applied agents throughout the follow up healing periods as compared to control groups where only mineral trioxide aggregate (MTA) was applied to seal off the exposed pulp. Non-significant differences recorded among the studied groups in duration comparison. There was no significant difference between the Collagen group and Coll/Laser groups.

Keywords: Laser Therapy; Histological; Collagen; Dental

Introduction

The dental pulp is enclosed in a rigid environment comprising three mineralized tissues: dentine, enamel and cementum. This strong mechanical support protects the pulp from the microbial rich oral environment. Dental pulp is a richly vascularized and innervated connective tissue of mesodermal origin enclosed by dentin with communications to the periodontal ligament. It occupies the center of each tooth and consists of soft connective tissue. During the initial carious attack, the pulp turn out to be inflamed and gradually, the evolution of the lesion leads to pulp necrosis and infection. New tissue formation in the pulp chamber can be observed after adequate infection control and the formation of a blood clot. Scaffolds with properties of extracellular matrix temporally support structures for cell growth, differentiation, and tissue formation.

It is still unclear whether there are sufficient numbers of resident stem cells within the pulp to achieve effective pulp repair and regeneration. However, the recruitment of MSCs from outside the pulp would appear to provide an efficient mechanism for locally raising stem cell numbers significantly within a short time scale after injury.

Mineral trioxide aggregate is a bioactive silicate cement that has proven to be an effective material for direct pulp capping teeth of dogs and non-human primates, as studies conducted by Ford, and Camilleri have demonstrated. Its small particles size, sealing
ability and marginal adaptation, the alkaline pH once hardened and the slow release of calcium ions are all behind its success. Laser treatment has advantages with respect to control of hemorrhage and sterilization. Laser irradiation of the exposed dental pulp is performed to stop bleeding and sterilize the area around the exposure. Low-level laser light seems to create many positive functions, such as accelerated wound healing, pain relief, regeneration, and immune enhancement through providing the energy that interacts with the cells.

Collagen, vitronectin, fibronectin, and laminin are the main extracellular matrix proteins (ECMP) which forms the natural scaffold. These ECMP have functions ranging from providing cell anchorage, sequestration of growth factors, and signal cells to migrate, differentiate, and proliferate through integrin receptor-mediated signaling pathways.

Collagen that has a potent hemostatic property and the ability to aggregate platelets, that facilitates wound maturation by enhancing initial blood clot and fibrin linkage formation. It is chemotactic for fibroblasts and improves their migration and attachment through its fibrillar structure. This property may enhance cell migration into the space between collagen membrane and the pulp wound. These collagen fibers are able to induce mineral formation and orient hydroxyapatite crystals.

**Materials and Method**

**Materials:** xylazine, ketamine, MTA, Collagen.

**Study Design**

Total samples of 40 rabbit incisors were selected. The collected teeth were divided into groups according to the applied agent for the healing periods (1 and 4 weeks) as follow:

(Control group (C), Laser group (L), Collagen group (Coll), Collagen/Laser group (Coll/L))

**Pulp capping procedure**

Pulp chamber was opened under aseptic conditions. Irrigation of normal saline was then performed until hemostasis achieved, then the cavity dried gently by cotton. Pulp capping was performed by using laser handpiece, tip No. (E4), bioactivation wavelength of (808 nm) was applied to the remaining pulp tissue for 2 seconds. For laser and collagen/laser groups. A tweezers used to add small piece of collagen sponge to fill the coronal pulp space. For collagen, and collagen/laser groups. Then MTA material applied to seal cavity for all studied groups.

**Histomorphometric analysis**

**Predentin thickness analysis**

The distance between the odontoblastic cell layers of the pulp to the border line of the dentin was considered for the measurement of the predentin thickness. A total of nine sites were considered for each specimen.

**Inflammation severity scores.**

The severity of the inflammatory infiltrate and the extension of pulp necrosis were determined using a four-point scoring system at power x40 of magnification based on the following criteria:

1. absence or insignificant presence of inflammatory infiltrate / necrosis.
2. inflammatory infiltrate / necrosis close to the pulp medication, reaching up to one third of the root canal pulp tissue.
3. inflammatory infiltrate / necrosis involving up to two thirds of the root canal pulp tissue.
4. inflammatory infiltrate / necrosis involving more than two thirds of the root canal pulp tissue.

**Statistical Analysis**

Data were analyzed using SPSS (statistical package of social science) software. The following statistical data analysis approaches were used in order to analyze and assess the results of this study:

Graphical presentation by using Line charts.

Inferential data analysis to accept or reject the statistical hypotheses, which included the following:

Analysis of Variance (ANOVA) for equality of means of several independent Groups with least significant difference (LSD and Games-Howell) Methods.

General Linear model (ANOVA) for two or three factors.
Results

Histological findings

One week duration Microphotograph view of control group after one week of pulp capping with MTA material shows pulp canal which appears filled with necrotic pulp and inflammatory cells, and a layer of reparative dentin, (figure 1). View of laser group shows thin layer of predentin deposited by odontoblasts which appear disoriented at some sites, organizing collagen fibers and fibroblasts (figure 2).

Histological examination of tooth section after one week of collagen application shows areas of hemorrhage, necrotic tissue (figure 3). After one week of laser exposure of pulp tissue capped with collagen the histological examination of tooth section shows remodeling fibers of pulp, a calciotraumatic line separates the tubular secondary dentin from the reactionary dentin, (figure 4).

Four weeks duration

Microphotograph view of control group after 4 weeks of pulp capping with MTA material shows conditions of inflammation and disorganization behavior of the pulp tissue, areas of hemorrhage (figure 5). Histological examination of tooth section after 4 weeks of collagen application shows different grades of inflammation and reorganization of pulp tissue with numerous blood vessels (figure 6).
Statistical Results

Table 1: LSD Multiple Comparisons of the studied parameters among groups.

<table>
<thead>
<tr>
<th>Dep. Variable</th>
<th>(I) GROUPS</th>
<th>(J) GROUPS</th>
<th>M D (I-J)</th>
<th>Std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predentin Thickness</td>
<td>C</td>
<td>L</td>
<td>-4.8570*</td>
<td>1.44912</td>
<td>.002 S</td>
</tr>
<tr>
<td></td>
<td>Coll</td>
<td></td>
<td>-5.3970*</td>
<td>1.44912</td>
<td>.001 HS</td>
</tr>
<tr>
<td></td>
<td>Coll and L</td>
<td></td>
<td>-3.2870*</td>
<td>1.44912</td>
<td>.030 S</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Coll</td>
<td>-5.400</td>
<td>1.44912</td>
<td>.712 NS</td>
</tr>
<tr>
<td></td>
<td>Coll and L</td>
<td></td>
<td>1.5700</td>
<td>1.44912</td>
<td>.287 NS</td>
</tr>
<tr>
<td></td>
<td>Coll</td>
<td>Coll and L</td>
<td>2.1100</td>
<td>1.44912</td>
<td>.155 NS</td>
</tr>
<tr>
<td>I_Severity Score</td>
<td>C</td>
<td>L</td>
<td>.7000</td>
<td>.35000</td>
<td>.054 NS</td>
</tr>
<tr>
<td></td>
<td>Coll</td>
<td></td>
<td>.8000*</td>
<td>.35000</td>
<td>.029 S</td>
</tr>
<tr>
<td></td>
<td>Coll and L</td>
<td></td>
<td>.8000*</td>
<td>.35000</td>
<td>.029 S</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Coll</td>
<td>.1000</td>
<td>.35000</td>
<td>.777 NS</td>
</tr>
<tr>
<td></td>
<td>Coll and L</td>
<td></td>
<td>.1000</td>
<td>.35000</td>
<td>.777 NS</td>
</tr>
<tr>
<td></td>
<td>Coll</td>
<td>Coll and L</td>
<td>.0000</td>
<td>.35000</td>
<td>1.000 NS</td>
</tr>
<tr>
<td>Morphological Organization Score</td>
<td>C</td>
<td>L</td>
<td>.4000</td>
<td>.29155</td>
<td>.180 NS</td>
</tr>
<tr>
<td></td>
<td>Coll</td>
<td></td>
<td>.7000*</td>
<td>.29155</td>
<td>.022 S</td>
</tr>
<tr>
<td></td>
<td>Coll and L</td>
<td></td>
<td>1.1000*</td>
<td>.29155</td>
<td>.001 HS</td>
</tr>
<tr>
<td></td>
<td>L</td>
<td>Coll</td>
<td>.3000</td>
<td>.29155</td>
<td>.311 NS</td>
</tr>
<tr>
<td></td>
<td>Coll and L</td>
<td></td>
<td>.7000*</td>
<td>.29155</td>
<td>.022 S</td>
</tr>
<tr>
<td></td>
<td>Coll</td>
<td>Coll and L</td>
<td>.4000</td>
<td>.29155</td>
<td>.180 NS</td>
</tr>
</tbody>
</table>

The error term is Mean Square (Error) = 10.500.

* The mean difference is significant at the .05 level.

Discussion

Pulp exposure can occur due to caries process, trauma or accidentally in an operative procedure. In response to these stimuli, at the exposure site, a new odontoblast-like cells are recruited and differentiated to synthesize reparative dentin [15]. Clinical studies have demonstrated induction of an early calcific tissue formation with MTA after 1 and 2 weeks, suggesting that mild inflammation of pulp with MTA is due to high alkalinity and is a reversible process [15, 16].

Histological evaluation of pulpal response to collagen particles impregnated in antibiotics revealed moderate to severe inflammatory cells with newly formed blood vessels and disorganized odontoblastic cell layer after 7, 15, and 30 days with dentinal bridge formation in two specimens proved efficacy of collagen as pulp medicament and its regenerative characteristics [12]. Which matches histological findings of present study regarding collagen groups although dentin bridge could not be detected in studied specimens may be due to application of collagen without addition of any medicament.
In addition, the creation of a reparatory bridge was not noticed in any of the tested samples after 6 weeks duration although collagen obviously led to the forming of new blood vessels and increased extravasation of erythrocytes as reported by Marsan [18] who used collagen for direct pulp capping of mongrel dogs incisors. This finding was explained as follows: Some kind of stimulative chemical factors (may be vitamins, amino acids and other nutritive factors) are necessary for the development of the protective reaction of traumatized dental pulp, and mere contact with biocompatible non-stimulative matter is not sufficient. Collagen, although possessing the capacity to initiate in vitro mineralization, does not show that feature in vivo conditions so creation of a dentine bridge was not observed.

**Predentin thickness (PT)**

With laser exposure PT mean counts showed the highest record (11.2mm) group comparison showed a significant difference between control and laser groups in studied durations which may indicate that use of LLLT in pulp capping before sealing the pulp with MTA material may enhance predentin formation, which seems to agree with Matsui [19] who used Alizarin Red S staining to reveal the amount of calcium which was higher in the laser irradiated group than in control group. Regarding the present findings of collagen application on exposed pulp the result revealed that mean values of PT (which in turn would be mineralized forming the new reparative dentin) were higher than control group, and there was significant difference between both groups while disagree with Suzuki [17] who found that: Laser irradiation was effective in arresting hemorrhaging but showed a tendency to delay reparative dentin formation.

**Inflammatory response analysis**

Giro [20] found that on the 7th day, the inflammatory cell response was significantly greater in pulp of teeth received corticosteroid/antibiotic dressing group. Regarding healing periods in the present study the inflammatory response scoring showed highest values after 1 week duration, and there was a significant difference between (C, Coll), and (C, Coll/L) groups while the other groups showed non-significant difference in duration comparison of applied materials. That might indicate that the use of collagen as a pulp capping material may reduce the inflammatory severity of the pulp.

Application of collagen with laser on exposed pulp might not affect the inflammatory reaction as results of group comparison showed a non-significant difference between collagen and collagen /laser groups. In this study, periods of 1 and 4 weeks were chosen to evaluate the effect of capping materials on pulp tissues. A study used different time interval (8 weeks duration) by Aljandan [21] who found this period to be long because a thick layer of reparative dentine had been formed by that time. Accordingly, interval of present study would be recommended as fairly enough for further studies on rabbits, as was noticed fairly proper growth of reparative dentine. Taking into consideration that rabbit incisor teeth are open-rooted and, in healthy animals, grow continuously [22].

**Conclusion**

It appears from the obtained findings of this study that pulp capping with collagen was efficient and combined laser therapy might have additive benefit in enhancing healing process.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**

5. Kim, J.Y., Xin, X., Moioli, E.K., Chung, J., Lee,


Investigation of Fungi Resistant to Disinfectants used in Burn Units at Baquba Teaching Hospital

Abbas M. AL-Ammari
Biology Department, College of Science, Diyala University, Iraq

Abstract
Fungal contamination of hospital environment considered as risk factor for burned patients. Therefore, the objective was to investigate the occurrence, distribution, and diversity of fungi in burn units at Baquba teaching hospital, Iraq.

One hundred eighty specimens environmental and instrumental specimens collected from Burn units at Baquba teaching hospital using transport media swabs. Ninety specimens were collected before sterilization and equal numbers were collected after sterilization. Swaps were cultured onto different culture media, the cultivated plates were incubated at 28ºC for 7-14 days with daily examination and observation.

Before and after sterilization, the percentages of fungal contamination were 63.3% and 40.0%, respectively. Before sterilization, *Aspergillus niger* was identified as the major contaminated species in burn units, with a percentage 19.3%. Whereas after sterilization, *A. niger* and *Penicillium* spp. were identified as the major contaminated species in burn units, with equal percentage 22.2%.

Our results concluded that a high frequency of fungal contamination in the burn units, particularly with *Aspergillus* spp. so these conditions considered a risk factor for burned patients and other persons in the hospital in particular who suffer from deficiency in immune system.

**Keywords:** Burn units, fungi, Before sterilization, after sterilization *Aspergillus* spp.

Introduction
Fungi constitute about 7% of all eukaryotes on the earth [1]. Hospitals introduce an excellent environment for a wide range of opportunistic fungi, therefore contamination of hospital environment by fungi considered as risk factor for causing fungal infection especially in patients with immunosuppression [2]. In hospital environments fungal spores are transmitted through air, air conditioning, patients and visitors [3].

Opportunistic fungi characterized with their ability to attack people who undergo deficiency in immune system due to many reasons like widespread use of antibiotics, chemotherapy, HIV, diabetes and organ transplant [4]. Opportunistic fungi include two forms, fungi which grow in form of multicellular filaments called molds such as *Aspergillus* spp., *Penicillium* spp. *Mucor* spp. and *Rhizopus* spp. whereas fungi grow as unicellular called yeast such as *Candida* spp., *Cryptococcus* spp. and *Malassezia* spp [5].

Disinfectant are used widely in health care settings especially, hospitals. Commercial disinfectants are classified as fungicides and fungistatics. Disinfectants that have low-level activity against fungi should not be used for disinfection of medical instruments that put in contact with the patient and environment. The most common of used disinfectants are alcohol, iodophors, aldehydes, and a chlorine-based agent were assessed at different concentrations. The long term use of disinfectants have confirmed some valuation on the development of fungal resistance, in particular cross-resistance to antibiotics [6].

**Corresponding author:**
Abbas M. AL-Ammari
E-mail: ammariabbas9@gmail.com.
Mobile number: 009647706381732
It is important to note that antifungal activity can be influenced by different factors such as presence of an organic load, dilution, formulation effects, temperature, synergy, and test method \cite{7}. Fungal infections are major causes of high mortality in burn wound injuries. Therefore, the incidence of fungal infections in burn wound patients appear to be a rising threat \cite{8}.

**Materials and Method**

One hundred eighty specimens collected from Burn units at Baquba Teaching Hospital using transport media swabs, the environmental and instrumental specimens including (air loaded of units, Beddings, Carriages, Floors, Spirometer and walls). Ninety specimens were collected before sterilization and equal numbers were collected after sterilization for a period of 5 months. Swabs were streaked onto different culture media include [Sabouraud’s Dextrose agar (SDA), Potato Dextrose agar (PDA) and Czapek agar], the cultivated plates were incubated at 28°C for 7-14 days with daily examination and observation \cite{9}.

Macroscopic features (Morphology and reverse of Colony) and Microscopic features (shape and color of hyphae and conidia) were examined according \cite{10}. Fungal isolates were cultured on slant of SDA and stored in a refrigerator at 4°C. This method was repeated every 3 weeks by activated culture on Sabouraud’s dextrose broth and re-cultured on slant of SDA to be still active for three months.

**Results**

A total of one hundred eighty specimens had been included in this research, consisting of equal proportion before and after sterilization, which was 50% (Table 1).

<table>
<thead>
<tr>
<th>Specimens Type of sterilization</th>
<th>Air</th>
<th>Beddings</th>
<th>Carriages</th>
<th>Floor</th>
<th>Spirometer</th>
<th>Walls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Sterilization</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>90</td>
</tr>
<tr>
<td>After Sterilization</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>180</td>
</tr>
</tbody>
</table>

Before and after sterilization, the percentages of fungal contamination were 63.3% and 40.0%, respectively (Table 2).

<table>
<thead>
<tr>
<th>Type of Sterilization Result</th>
<th>Before sterilization</th>
<th>After sterilization</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>Positive</td>
<td>57</td>
<td>63.3%</td>
<td>36</td>
</tr>
<tr>
<td>Negative</td>
<td>33</td>
<td>36.7%</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>90</td>
<td>100%</td>
<td>90</td>
</tr>
</tbody>
</table>

**Percentage of fungal isolates:**

Before sterilization, *Aspergillus niger* was identified as the major contaminated species in burn unit, with a percentage 19.3% (11 out of 57). Whereas after sterilization, *A. niger* and *Penicillium* spp. were identified as the major contaminated species in burn unit, with equal percentage 22.2% (8 out of 36) (Table 3).
Table 3: Percentage of fungal isolates

Before sterilization, *A. niger* was the most species isolated from air specimen with a percentage 26.6% (4 out of 15) (Table 4).

Table 4: Percentage of fungal isolates according to contaminated sites (Before sterilization)

<table>
<thead>
<tr>
<th>Fungal isolates</th>
<th>Air No.</th>
<th>Air %</th>
<th>Beddings No.</th>
<th>Beddings %</th>
<th>Carriages No.</th>
<th>Carriages %</th>
<th>Floor No.</th>
<th>Floor %</th>
<th>Spirometer No.</th>
<th>Spirometer %</th>
<th>Spirometer walls No.</th>
<th>Spirometer walls %</th>
<th>Total No.</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aspergillus niger</em></td>
<td>4</td>
<td>26.6%</td>
<td>1</td>
<td>11.1%</td>
<td>1</td>
<td>33.3%</td>
<td>2</td>
<td>14.3%</td>
<td>2</td>
<td>19.3%</td>
<td>11</td>
<td>19.3%</td>
<td>11</td>
<td>100.0%</td>
</tr>
<tr>
<td><em>Penicillium spp.</em></td>
<td>2</td>
<td>13.3%</td>
<td>1</td>
<td>11.1%</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
<td>21.4%</td>
<td>2</td>
<td>20.9%</td>
<td>3</td>
<td>21.4%</td>
<td>7</td>
<td>100.0%</td>
</tr>
<tr>
<td><em>Aspergillus flavus</em></td>
<td>2</td>
<td>13.3%</td>
<td>2</td>
<td>22.2%</td>
<td>1</td>
<td>33.3%</td>
<td>2</td>
<td>14.3%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>9.1%</td>
<td>8</td>
<td>14.04%</td>
</tr>
<tr>
<td><em>Candida albicans</em></td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
<td>22.2%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>7.14%</td>
<td>1</td>
<td>20.9%</td>
<td>2</td>
<td>18.2%</td>
<td>6</td>
<td>10.53%</td>
</tr>
<tr>
<td><em>Rhizopus spp.</em></td>
<td>1</td>
<td>6.7%</td>
<td>1</td>
<td>11.1%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>7.14%</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
<td>18.2%</td>
<td>5</td>
<td>8.77%</td>
</tr>
<tr>
<td><em>Fusarium spp.</em></td>
<td>2</td>
<td>13.3%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>14.3%</td>
<td>1</td>
<td>20.9%</td>
<td>0</td>
<td>0.0%</td>
<td>4</td>
<td>7.02%</td>
</tr>
<tr>
<td><em>Aspergillus terreus</em></td>
<td>1</td>
<td>6.7%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
<td>14.3%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>9.1%</td>
<td>4</td>
<td>7.02%</td>
</tr>
<tr>
<td><em>Cryptococcus neoformans</em></td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>11.1%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>7.14%</td>
<td>1</td>
<td>20.9%</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
<td>5.26%</td>
</tr>
<tr>
<td><em>Rhizopus spp.</em></td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>11.1%</td>
<td>1</td>
<td>33.3%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>20.9%</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
<td>5.26%</td>
</tr>
<tr>
<td><em>Aspergillus fumigates</em></td>
<td>1</td>
<td>6.7%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>7.14%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
<td>3.51%</td>
</tr>
<tr>
<td><em>Cladosporium spp.</em></td>
<td>1</td>
<td>6.7%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>1.75%</td>
</tr>
<tr>
<td><em>Aspergillus versicolor</em></td>
<td>1</td>
<td>6.7%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>1.75%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td>100.0%</td>
<td>9</td>
<td>100.0%</td>
<td>3</td>
<td>100.0%</td>
<td>14</td>
<td>100.0%</td>
<td>5</td>
<td>100.0%</td>
<td>11</td>
<td>100.0%</td>
<td>57</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

After sterilization, *A. niger* was the most species isolated from air specimen with a percentage 33.3% (3 out of 9) (Table 5).

Table 5: Percentage of fungal isolates according to contaminated sites (After sterilization)

<table>
<thead>
<tr>
<th>Fungal isolates</th>
<th>Air No.</th>
<th>Air %</th>
<th>Beddings No.</th>
<th>Beddings %</th>
<th>Carriages No.</th>
<th>Carriages %</th>
<th>Floor No.</th>
<th>Floor %</th>
<th>Spirometer No.</th>
<th>Spirometer %</th>
<th>Spirometer walls No.</th>
<th>Spirometer walls %</th>
<th>Total No.</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Aspergillus niger</em></td>
<td>3</td>
<td>33.3%</td>
<td>1</td>
<td>12.5%</td>
<td>1</td>
<td>50%</td>
<td>1</td>
<td>14.3%</td>
<td>2</td>
<td>25%</td>
<td>8</td>
<td>22.2%</td>
<td>8</td>
<td>22.2%</td>
</tr>
<tr>
<td><em>Penicillium spp.</em></td>
<td>2</td>
<td>22.2%</td>
<td>1</td>
<td>12.5%</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
<td>28.6%</td>
<td>2</td>
<td>25%</td>
<td>8</td>
<td>22.2%</td>
<td>8</td>
<td>22.2%</td>
</tr>
<tr>
<td><em>Aspergillus flavus</em></td>
<td>1</td>
<td>11.1%</td>
<td>2</td>
<td>25%</td>
<td>1</td>
<td>50%</td>
<td>1</td>
<td>14.3%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>5</td>
<td>13.9%</td>
</tr>
<tr>
<td><em>Candida albicans</em></td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>12.5%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>14.3%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>12.5%</td>
<td>3</td>
<td>8.3%</td>
</tr>
<tr>
<td><em>Rhizopus spp.</em></td>
<td>1</td>
<td>11.1%</td>
<td>1</td>
<td>12.5%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>12.5%</td>
<td>3</td>
<td>8.3%</td>
</tr>
<tr>
<td><em>Fusarium spp.</em></td>
<td>1</td>
<td>11.1%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>1.75%</td>
</tr>
<tr>
<td><em>Aspergillus terreus</em></td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>14.3%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>12.5%</td>
<td>2</td>
<td>5.6%</td>
</tr>
<tr>
<td><em>Cryptococcus neoformans</em></td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>12.5%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>14.3%</td>
<td>0</td>
<td>50.0%</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
<td>8.3%</td>
</tr>
<tr>
<td><em>Mucor spp.</em></td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>12.5%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>2.8%</td>
</tr>
<tr>
<td><em>Aspergillus fumigates</em></td>
<td>1</td>
<td>11.1%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>2.8%</td>
</tr>
<tr>
<td><em>Cladosporium spp.</em></td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><em>Aspergillus versicolor</em></td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>9</td>
<td>100.0%</td>
<td>8</td>
<td>100.0%</td>
<td>2</td>
<td>100.0%</td>
<td>7</td>
<td>100.0%</td>
<td>2</td>
<td>100.0%</td>
<td>8</td>
<td>100.0%</td>
<td>36</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Discussion

The contamination of hospital environments especially, that settled in the neighborhood of burned patients, may cause complications burn wound infection in particular who suffer from immunodeficiency. In this survey, *A. niger* was the most common isolate from burn units before and after sterilization. This indicates a risk of acquiring fungal infection from the instruments and environment which surrounded burn units. These results agree with [11, 12] who revealed that *A. niger* was the most fungal contaminated of burn units. We found *A. fumigatus* was responsible for 4.6% of infections occurred in burn patients. The mortality rate has been estimated to be as high as 95% and even higher in immunocompromised patients [13].

According to the sites of specimens, this agree with [14] who founded that air was most contaminated. The explanation of these results may be due to the hot weather and humidity in Iraq. In view of the results of this survey, it is recommended that a regular decontamination of burn units especially in thermally injured children and other immunocompromised patients [15]. *Aspergillus* spp. are exist in different environments such as water, soil and decaying foods, so many places could be named as the hospitals reservoirs of *Aspergillus*, places such as, ventilation system, exhausted water pipe system, air exposed to dust from wards under construction [13].

Conclusion

The results of this survey concluded a high frequency of fungal contamination in the burn units, particularly with *Aspergillus* spp. and these conditions should be considered as a risk factor for burned patients and other persons in the hospital in particular who suffer from deficiency in immune system.

Acknowledgment: I would like to acknowledge all stuff of burn unit at Baquba teaching hospital.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


Choosing of the Best Estimate of the Parameters of the Multiple Linear Regression Model of Infertility Using the Weighted Least Squares (WLS) and Robust M

Saif Hussein Ali¹, Ahmed Hamza Abood², Shrook.A.S.AL-Sabbah¹

¹Statistics Department, Administration And Economics College, Kerbala University, Iraq.
²Department of Anatomy, Medical College, Kerbela University, Iraq

Abstract

In this research, methods were used to estimate the parameters of the multiple regression model, namely the method of the weighted least squares (WLS) and the robust- M methods, to show the effect of the presence of outliers values in the observation values on the regression model. A simple random sample of 151 infertile individuals are drawn as dependent variable (size of egg), and Independent variables (age, weight, infertility type, LH Hormone, FSH Hormone, PL Hormone) to compare these methods and to determinate the best method of estimation using measures mean square error MSE and Determination Coefficient, and through the program Stata we found that the best method to estimate was robust- M (Turkey’s biweight).

Keywords: robust M, multiple regressions, estimation

Introduction

Statistical methods are based on a set of important assumptions to obtain a precise regression model, and the probability distribution of data is the most important of the assumptions under study, which are often distributed normally. Sometimes, distributed of data take a different pattern and may not be represented by a particular pattern of distributions, this may sometimes be due to the presence of outliers, which leads to imbalance in the assumptions of the least squares and then loses their good properties, for that we must find a method that is not sensitive to the presence of outliers values and gives us efficient estimates.

Aim of Research:

Comparison of M-robust methods with the WLS method to study the effect of outliers values in the multiple linear regression model.

Theoretical Side:

Weighted least squares method (WLS)¹

The least squares method assumes that there is a constant variation in errors, then we will use the weighted least squares method when the error that not constant, i.e. violation of the least squares method assumptions which is Hetrocadastasity, then the model is:

\[ Y = X\beta + U \]

Where U. It is supposed to be multivariate is usually distributed with a medium vector (0) and variance-covariance matrix, note that each weight is inversely proportional to the error variance, and the weighted least squares are estimated.

In the general linear model:

\[
\begin{bmatrix}
\sqrt{W_1}Y_1 \\
\sqrt{W_2}Y_2 \\
\vdots \\
\sqrt{W_n}Y_n
\end{bmatrix} = \begin{bmatrix}
\sqrt{W_1}X_{11} & \ldots & \sqrt{W_1}X_{1k} \\
\sqrt{W_2}X_{21} & \ldots & \sqrt{W_2}X_{2k} \\
\vdots \\
\sqrt{W_n}X_{nk1} & \ldots & \sqrt{W_n}X_{nkk}
\end{bmatrix} \begin{bmatrix}
\beta_1 \\
\beta_2 \\
\vdots \\
\beta_k
\end{bmatrix} + \begin{bmatrix}
\sqrt{W_1}U_1 \\
\sqrt{W_2}U_2 \\
\vdots \\
\sqrt{W_n}U_n
\end{bmatrix}
\]

We will represent as a shortcut:

\[ P^{-1}y = P^{-1}X\hat{\beta} + P^{-1}u \quad (1) \]
In the general linear model above satisfy the least squares method assumptions because:

\[
E(u, \hat{u}_r) = E\left[ (P^{-1}U - (P^{-1}U)^\prime) \right] \\
= E\left[ (P^{-1}U U^\prime P^{-1})^\prime \right] \\
= P^{-1}E(U U^\prime)P^{-1} \\
= \sigma_u^2 P^{-1} \hat{P} \hat{P}^{-1} \\
E(u, \hat{u}_r) = \sigma_u^2 I_n \quad \text{---(2)}
\]

Equation (2) satisfies the assumptions of the Auto-correlation and satisfies the hypothesis of Heterocedastasy, Therefore, the assumptions of the regression model are realized, and will we use the least squares approach to estimate the vector of parameters as following:
$P^{-1}y = P^{-1}X\hat{\beta} + P^{-1}U$

$P^{-1}U = P^{-1}y - P^{-1}X\hat{\beta}$

$(P^{-1}U)(P^{-1}U) = (P^{-1}y - P^{-1}X\hat{\beta})(P^{-1}y - P^{-1}X\hat{\beta})$

$= (\hat{\beta}P^{-1} - X\hat{\beta}P^{-1})(P^{-1}y - P^{-1}X\hat{\beta})$

$(U(P^{-1}U)^{-1}) = \hat{\beta}P^{-1}P^{-1}y - X\hat{\beta}P^{-1}P^{-1}X\beta - \hat{\beta}X\hat{\beta}P^{-1}P^{-1}Y + \hat{\beta}X\hat{\beta}P^{-1}P^{-1}X\beta$

$(UW^{-1}U) = \hat{\beta}W^{-1}P^{-1}P^{-1}y - \hat{\beta}W^{-1}P^{-1}X\beta - X\hat{\beta}W^{-1}X\beta + \hat{\beta}X\hat{\beta}W^{-1}X\beta$

By taking the first partial differential for the vector $(\beta)$ we will get:

$\frac{\partial(UW^{-1}U)}{\partial \beta} = -2XW^{-1}Y + \hat{\beta}W^{-1}X\beta_{WLS} = 0$

$(XW^{-1}Y) = \hat{\beta}W^{-1}X\beta_{WLS}$

$\hat{\beta}_{WLS} = (XW^{-1}X)^{-1}XW^{-1}Y \quad ... (3)$

Equation (3) gives us the best unbiased linear estimate of the parameter $(\beta)$ in the case of Heterocadastasity and is called the method of estimation in the method of Weighted Least Square (WLS), since this method is based on weights mainly.

$\begin{bmatrix}
\hat{\beta}_0 \\
\hat{\beta}_1 \\
\vdots \\
\hat{\beta}_K
\end{bmatrix} = (XW^{-1}X)^{-1}XW^{-1}(X\beta + U)$

$= (XW^{-1}X)^{-1}XW^{-1}X\beta + (XW^{-1}X)^{-1}XW^{-1}U$

As:

$\therefore E(\hat{\beta}_{WLS}) = \beta \quad ... (4)$

And the variance-covariance matrix for the parameters vector is:

$\hat{\beta}_{WLS} - \hat{\beta} = (XW^{-1}X)^{-1}XW^{-1}U$
Var − Cov\(^{\beta_{WLS}}\) = Var − Cov \[
\begin{bmatrix}
\hat{\beta}_0 \\
\hat{\beta}_1 \\
\vdots \\
\hat{\beta}_K
\end{bmatrix}
\] = E \[
\left(\hat{\beta} - \beta \right) \left(\hat{\beta} - \beta \right)'
\]

= E \left\{ \left(\hat{X}W^{-1}X\right)^{-1}\hat{X}W^{-1}U \right\} \left(\hat{X}W^{-1}X\right)^{-1}

= \sigma^2_0 \left(\hat{X}W^{-1}X\right)^{-1}\hat{X}W^{-1}X(X\hat{X}X)^{-1}

\text{var − cov}(\hat{\beta}_{WLS}) = [\sigma^2_0(\hat{X}W^{-1}X)^{-1}] \quad \ldots (5)

The equation above gives us the variance and the co-variation of the parameters parameter (\(\hat{\beta}_{WLS}\)) which contains the parameters of the model studied in case of Heterocadastasy. Where the sample variance (\(S^2_\epsilon\)) can be estimated as follows:

\[
E(S^2_\epsilon) = \frac{E(\hat{\epsilon}\hat{\epsilon}^*)}{n-k-1}
\]

= \frac{(P^{-1}Y - P^{-1}\hat{X}\hat{\beta}) (P^{-1}Y - P^{-1}\hat{X}\hat{\beta})}{n-k-1}

= \frac{\left(\hat{Y}P^{-1} - \hat{\beta}\hat{X}P^{-1}\right) (P^{-1}Y - P^{-1}\hat{X}\hat{\beta})}{n-k-1}

\[
S^2_\epsilon = \frac{\hat{\epsilon}W^{-1}\hat{\epsilon}}{n-k-1} \quad \ldots (6)
\]

\[
\hat{\epsilon}W^{-1}\hat{\epsilon} = \left(\hat{Y} - \hat{\beta}\hat{X}\right) W^{-1} \left(\hat{Y} - \hat{\beta}\hat{X}\right)
\]

= \left(\hat{Y} - \hat{\beta}\hat{X}\right) W^{-1} \left(\hat{Y} - \hat{\beta}\hat{X}\right)

= \hat{Y}W^{-1}Y - \hat{\beta}W^{-1}X\hat{\beta} - \hat{\beta}\hat{X}W^{-1}Y + \hat{\beta}\hat{X}W^{-1}X\hat{\beta}
\[
= \hat{Y}W^{-1}Y - \hat{\beta}\hat{X}W^{-1}Y
\]

\[
S^2_e = \frac{\hat{Y}W^{-1}Y - \hat{\beta}\hat{X}W^{-1}Y}{n-k-1} \quad \ldots (7)
\]

Robust Estimation Methods\textsuperscript{[2]}

The traditional methods of estimating the parameters of the model are inaccurate in the analysis of data when there is a defect in regression assumptions, or presence of outlier's values or the distribution of random error is not normally distributed. The existence of one or more outlier values will lead to effect in LS properties, the robust estimator should then be used for conservation on the properties of parameters when you violate model assumptions, we shall address some of the following robust methods of estimation as following:

The robust-M method\textsuperscript{[4][6][5][3]}

It's one of robust estimation method, the letter M is mean that the maximum Likelihood. The M estimate is:

\[
\hat{\beta} = [\beta_n(x_1, x_2, \ldots, x_n)] = \beta \quad \ldots (8)
\]

By taking expectation:

\[E[\beta_n(x_1, x_2, \ldots, x_n)] = \beta\]

From equation (8):

\[
\hat{\beta} = [\beta_n(x_1, x_2, \ldots, x_n)]
\]

Which is minimum variance unbiased estimation (MUVE), and M-estimator have minimum variance comparing with the others estimates.

\[
\text{var} \left( \hat{\beta} \right) \geq \frac{[\hat{\beta}]^2}{nE[\frac{\partial}{\partial \beta} ln f (x_i; \beta)]^2}
\]

Where \( \hat{\beta} \) another unbiased linear estimator for \( \beta \)

The principle of the M method of estimation is to reduce or minimize the P residual function:
\[ \beta_m = \min_{\beta} P(y_i - \sum_{j=0}^{k} x_{ij}\beta_j) \ldots (9) \]

We must solve:

\[ \min_{\beta} \sum_{i=1}^{n} P(u_i) = \min_{\beta} \sum_{i=1}^{n} P(e_i / \sigma) \]

\[ = \min_{\beta} \sum_{i=1}^{n} P \left( \frac{y_i - \sum_{j=0}^{k} x_{ij}\beta_j}{\sigma} \right) \]

To obtain the (9) equation we put the estimate \( \sigma \) as following: \(^{[7]}\)

\[ \hat{\sigma} = \frac{\text{MAD}}{0.6745} = \frac{\text{median}|e_i - \text{median}(e_i)|}{0.6745} \]

For the function \( \rho \), Tukeys' bissquares, the objective function:

\[ p(u_i) = \begin{cases} 
\frac{u_i^2}{2} - \frac{u_i^4}{2c^4} + \frac{u_i^6}{6c^6}, & |u_i| \leq c \\
\frac{c^2}{6}, & |u_i| > c 
\end{cases} \]

Moreover we are looking for the first partial derivative \( \beta_m \) for \( \beta \)

\[ \sum_{i=1}^{n} x_{ij} \psi \left( \frac{y_i - \sum_{j=0}^{k} x_{ij}\beta_j}{\hat{\sigma}} \right) = 0 \ldots (10) \]

\[ , j = 0, 1, 2, 3, \ldots, k \]

Where:

\[ p' = \psi \], is the first observation for the independent variable \( \sum_{i=1}^{n} x_{i0} = 1 \)

\[ (e_i) = \frac{\psi \left( \frac{y_i - \sum_{j=0}^{k} x_{ij}\beta_j}{\hat{\sigma}} \right)}{\left( \frac{y_i - \sum_{j=0}^{k} x_{ij}\beta_j}{\hat{\sigma}} \right)} \ldots (11) \]

\[ W_i = \begin{cases} 
\left[ 1 - \left( \frac{u_i}{c} \right)^2 \right]^2, & |u_i| \leq c \\
0, & |u_i| > c 
\end{cases} \]

We take \( c = 4.685 \) for odd Tukeys biasquare function, and then the equation (10) became:
\[ \sum_{i=1}^{n} x_{ij}w_i(y_i - \sum_{j=0}^{k} x_{ij}\beta_j) = 0 \quad , j=0,1,...,k \quad \ldots (12) \]

This method assumes that initial estimator \( \beta \) and \( \hat{\sigma}_i \), then:

\[ \sum_{i=1}^{n} x_{ij}w_0(y_i - \sum_{j=0}^{k} x_{ij}\beta_0) = 0 \quad , j=0,1,...,k \quad \ldots (13) \]

The equation (13) may be written as:

\[ X'W_iX\beta = X'W_iY \quad \ldots (14) \]

\( W_i \) is a matrix of rank \( n \times n \) and its weight has the main diameter elements. Equation (13) is known as the WLS and the solution to this equation is given an estimate of \( \beta \), in other words:

\[ \hat{\beta} = (X'W_iX)^{-1}(X'W_iY) \]

Andres function \cite{8}

\[ \psi(u) = \begin{cases} \sin(u/c) & ; |u| < c\pi \\ 0 & ; |u| \geq c\pi \end{cases} \ldots (15) \]

C is take: 2.1 , 1.5 , 1.339

Applied side:

**Fertility:** \cite{9}

Fertility is influenced by age and weight of the women. Generally, women’s reproductive potential decreases as they get older and fatter due to normal, age-related changes in quantity and quality of egg in the ovaries and the eggs tend to get smaller and less (loss of ovarian reserve).

With the beginning of each menstrual cycle, a group of eggs matures regularly inside of fluid-filled spheres called “follicles.” Under the stimulation of pituitary hormones such as follicle-stimulating (FSH) and prolactin (PL). Normally, only one of those follicles will reach maturity and release an egg (ovulate). The process of ovulation occurs under the effect of another pituitary hormone, that is luteinizing hormone (LH) and the remainder of follicles gradually will stop growing and degenerate.

Based on this information, we used robust methods as a statistical method suitable for studying data. Six independent variables (age, weight, infertility, LH, FSH, PL) were found to affect the response variable (egg size) in a simple random sample consisting of (151) people with infertility

**Data descriptive:**

A simple random sample of 151 infertile individuals in Dhi-Qar Governorate of Al Hussein Educational Hospital - Center of Infertility is represented by the following:

The dependent variable (Y) represents the size of the egg.

The first independent variable (X1) represents the age.

The second independent variable (X2) represents the weight.

The third independent variable (X3) represents the infertility type.

The fourth independent variable (X4) represents LH
Hormone.

The fifth independent variable (X5) represents FSH Hormone.

The sixth independent variable (X6) represents the PL Hormone.

[9] Egg size:

The egg size reflects the quality of the eggs and is considered as an indicator to egg reserve in the ovary and has a significant impact on the pregnancy potential of the ladies. Women are less likely to become pregnant and more susceptible to miscarriage if the quality and number of eggs decreases. These changes were observed in women who reach their mid-thirties more than others. Therefore, the age of women is the most accurate test of eggs quality

[10]: Age

A women’s best reproductive years are in their 20s. Fertility gradually drops in the 30s, chiefly after age 35

Weight: [10]

Excess weight affects ovulation as makes it irregular and thus leads to infertility due to the effect of weight on the levels of hormones, specifically progesterone and estrogen, which have a role in the preparation of the uterus to receive, and implantation of fertilized eggs in the lining of the uterus

Type’s infertility

Primary infertility:

It is the infertility that afflicts women since the beginning of their married life and its causes are due to disorders in the endocrine gland i or chromosomal abnormalities

Secondary infertility

Is the infertility that afflicts a woman after giving birth to a child or two children or after an abortion or as a result of complications of childbirth or abortion. All uterine infections can lead to an increase in infertility rate

[11] Luteinizing hormone (LH)

Is a hormone produced by the anterior lobe of the pituitary gland. It triggers ovulation


Is a hormone produced by the anterior lobe of the pituitary gland. It regulates the development, growth, pubertal maturation, and reproductive processes of the body

Prolactin Hormone (PL): [12]

Is a hormone produced by the anterior lobe of the pituitary gland? Elevated levels of prolactin decrease the levels of sex hormones estrogen in women that leads to prevent implantation of fertilizing egg and infertility

WLS:

In this method to estimate and test the parameters of the robust regression model, we used the SPSS statistical program, according to the null hypothesis:

Using the Stata program, the results of estimating the multiple regression model using WLS were presented in Table (2-1) as follows:

Table (1) shows the values of regression coefficients in WLS

<table>
<thead>
<tr>
<th>t</th>
<th>Standard error</th>
<th>regression coefficients (b)</th>
<th>Independent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>.000</td>
<td>7.896</td>
<td>.087</td>
<td>.688</td>
</tr>
<tr>
<td>.000</td>
<td>4.359</td>
<td>.040</td>
<td>.176</td>
</tr>
<tr>
<td>.516</td>
<td>-.652-</td>
<td>.276</td>
<td>-.180-</td>
</tr>
<tr>
<td>.897</td>
<td>.129</td>
<td>.157</td>
<td>.020</td>
</tr>
<tr>
<td>.186</td>
<td>1.330</td>
<td>.107</td>
<td>.142</td>
</tr>
<tr>
<td>.007</td>
<td>-2.717-</td>
<td>.077</td>
<td>-.208-</td>
</tr>
<tr>
<td>.000</td>
<td>-8.494-</td>
<td>2.066</td>
<td>-17.547-</td>
</tr>
</tbody>
</table>
The above table shows the significance of age and weight variables and the PL hormone because the value of P-value is smaller than (0.05). And non-significant type of infertility and hormone LH and FSH hormone, because the probability values associated with each of them amounted to (0.516, 0.897, 0.186), the largest (0.05).

**Tukey’s biweight:**

An important method used to estimate the parameters of the robust regression model, is to test the null hypothesis:

Using the statistical program (stata) where the results of the estimation of the multiple regression models using M (Tukey’s biweight) presented in Table (4-3) as the following:

**Table (2) shows the values of regression coefficients in Tukey’s biweight**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>t</th>
<th>Standard error</th>
<th>regression coefficients (b)</th>
<th>t (ege)</th>
<th>0.05126107</th>
<th>-0.2544904</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ege)</td>
<td>-4.9646</td>
<td>0.05126107</td>
<td>-0.2544904</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(weight)</td>
<td>11.9185</td>
<td>0.01905513</td>
<td>0.2271079</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Type of fertility)</td>
<td>-0.8807</td>
<td>0.1369224</td>
<td>-0.120593</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hormone LH)</td>
<td>6.5078</td>
<td>0.0936127</td>
<td>0.6092089</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hormone FSH)</td>
<td>-9.7363</td>
<td>0.05468547</td>
<td>-0.5324315</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hormone PL)</td>
<td>20.0505</td>
<td>0.02184197</td>
<td>0.4379432</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows the significance of age, weight, LH, FSH, and PL hormones, because the value of P-value for each is less than 0.05). While the results of the test did not show significant variable infertility type, P-value) was (0.380636) greater than 0.05).

**Andrew’s sine:**

In this way, the statistical program Stata was used to estimate and test the parameters of the robust regression model, noting that the null hypothesis:

Using the Stata program, the results of the estimation of the multiple regression model using the H (Andrews sine) regression method were presented in Table (2-2) as follows:

**Table (3) shows the values of regression coefficients in the M Andrews sine method**

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>t</th>
<th>Standard error</th>
<th>regression coefficients (b)</th>
<th>Standard error</th>
<th>0.05838053</th>
<th>0.6667873</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ege)</td>
<td>11.4214</td>
<td>0.05838053</td>
<td>0.6667873</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(weight)</td>
<td>-5.6358</td>
<td>0.02029908</td>
<td>-0.1144007</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Type of fertility)</td>
<td>-0.7064</td>
<td>0.2443274</td>
<td>-0.1725949</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hormone LH)</td>
<td>-0.4526</td>
<td>0.10088</td>
<td>-0.04566197</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hormone FSH)</td>
<td>1.0407</td>
<td>0.06826142</td>
<td>0.07104213</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Hormone PL)</td>
<td>7.0320</td>
<td>0.03201792</td>
<td>0.225149</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(P-value) is smaller than the mean level of 0.05). While the results of the test did not show significant variables of the type of infertility and LH hormone and FSH hormone, because the value of (P-value) respectively (0.481218, 0.651577, 0.299960), respectively, and that the value of (P-value) each of the largest 0.05).

Table (4) shows the Determination Coefficient and MSE

<table>
<thead>
<tr>
<th>Method</th>
<th>MSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLS</td>
<td>1.288</td>
</tr>
<tr>
<td>M (Andrews sin)</td>
<td>0.429</td>
</tr>
<tr>
<td>M Turkey’s bi weight</td>
<td>0.0551</td>
</tr>
</tbody>
</table>

In order to compare the estimation methods, the MSE and the criterion of the determination coefficient. The results were as in the above table, which shows the advantage of the regression method of M (Turkey’s biweight) method because the value of MSE is 0.0551, The determination coefficient is 0.9997 which is the highest value.

Conclusion

Based on the estimation results of the methods which used in the applied side, some of the conclusions were reached:

1. Turkey’s biweight method is preferable to MSE and \( R^2 \).
2. Methods of estimation showed significant effect of age in infertility. These methods also showed a significant weight variable followed by a significant difference of PL effect in response variable (infertility).

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References

5. Yuliana and Y. Susanti, Estimasi M dan sifat-sifatnya pada Regresi Linear Robust, Jurnal Math-Info, 1, No. 11 (2008), 8-16.
6. Y. Susanti and H. Pratiwi, Robust Regression Model for Predicting the Soybean Production in Indonesia, Canadian Journal on Scientific and Industrial Research, 2, No. 9 (2011), 318-328.
10. Infertility and its Treatment, The NEW YORK task force on life and the law . 1998, NEW YORK

12. Sana Dweikan, “What is the hormone milk,” an article posted on the site on the Internet at the following website: - https://mawdoo3.com/2018
Analysis of Toll-Like Receptor-4 Genes Polymorphism and Il-18 in Severe Chronic Periodontitis

Raghad Fadhil1, Nada M.H. AL-Ghaban1, Batool Hassan Al Ghurabi1

1Department of periodontics, College of dentistry, University of Baghdad, Iraq

Abstract

A number of genetic polymorphisms have been associated with risk for periodontal disease in various populations. The genes encoding toll like receptor-4 (TLR-4) may affect susceptibility to and/or severity of periodontitis. Several studies have shown that the levels of interleukin-18 (IL-18) in patients with periodontitis differ from those in healthy subjects. IL-18 is synthesized intracellularly after TLR4 is activated by lipopolysaccharides.

A case control approach used to explore the correlation between polymorphisms in TLR4 and the degree of susceptibility and severity of chronic periodontitis, also exploring the impact of TLR4 polymorphism on circulating cytokines IL-18 in chronic periodontitis patients.

Ninety six Iraqi subjects (69 males and 27 females) their age range (30-50) years were included in study divided in to two groups (patients with severe chronic periodontitis and healthy control) venous blood were collected from each patients for immunologic analysis of IL-18 and genetic analysis of TLR-4.

Analytic statistics for serum IL-18 between chronic periodontitis and control groups showed significant decrease in the medium of IL-18 in chronic periodontitis group compared to control group. Furthermore, two single nucleotide polymorphisms (SNPs) were detected in TLR-4 according to primer design located at rs 4986790 and rs 4986791, with non-significant association of both SNPs with chronic periodontitis patients although both SNP were strongly correlated with the amount of dental plaque.

Genetic polymorphisms in TLR-4 were not associated with the susceptibility of periodontitis in Iraqi patients. However, they might have an association with the clinical parameters and can modify severity of the disease. High frequencies of TLR-4 at rs4986790 in control group suggest that these alleles may confer protective effects against the disease or a low, weak susceptibility to periodontal disease.

Keywords: toll like receptor -4, IL-18, severe chronic periodontitis, gene polymorphisms.

Introduction

Periodontal disease is a chronic inflammation of the teeth-supporting structures, like other common multifactorial diseases, genetic and environmental risk factors affect the development and advancement of periodontal disease (1-3). Genetic host factors may be responsible in determining susceptibility to periodontal disease (4). Toll- like receptors are a family of at least 13 proteins that act as key pathogen- recognition receptors in the innate immune system, reacted to varied microbial products and injury- induced endogenous products (5-7). TLR-2, 3, 4 and 9 are mostly expressed in gingival tissues of periodontitis patients, suggesting that these receptors have a distinct ability to activate and influence downstream cytokine expression; TLR4 distinguish lipopolysaccharide (LPS) from a number of viral and bacterial proteins (8). Interleukin-18 is a pro-inflammatory cytokine and magnify immune responses by inducing other cytokines viz. IL-1β, TNF-α and IL-8 (9). IL-18 is synthesized intracellularly as a biologically passive precursor and demand caspase-1
to cleave it into the active IL-18 molecule. This process could happen after TLR4 is stimulated by bacterial lipopolysaccharides \(^{(10)}\). Moreover, molecular receptors such as TLR-2 and TLR-4 could also be recognized by uric acid to intervene inflammation \(^{(11)}\). Shaheena et al showed that TLR-4, IL-18 and uric acid may have a role in the inflammatory pathology of periodontitis \(^{(12)}\). The aim of the current study used a case control approach to explore the correlation between polymorphisms in TLR4 and the degree of susceptibility to and severity of chronic periodontitis, also to investigate the impact of TLR4 polymorphism on circulating cytokines IL-18 in chronic periodontitis patients.

**Material and Method**

Ninety six Iraqi subjects their age range (30-50) years were included in a case control study divided in to two groups: - **chronic periodontitis group** was included 55 patients with severe generalized chronic periodontitis while **Control Group** was consisted of 41 Iraqi volunteers all showed a clinical healthy periodontium.

Then clinical periodontal parameters (plaque index (PI), gingival index (GI), probing pocket depth (PPD), clinical attachment level (CAL) were recorded for each subject and venous blood collected from the antecubital vein, in 5ml vacutainer glass blood collection tubes. Two ml of venous blood was transferred into tube buffered with sodium citrate 3.2% and kept at -40°C for the genotyping of TLR4 while the other three ml were placed in gel separating tube and centrifuged to separate the serum from the cells for cytokine analysis (IL-18), for 10 min at 3300g. The obtained blood serum was placed into sterile Eppendorf vials and kept at −40°C until being analyzed.

**Immunological analysis:**

For immunological analysis detection of serum IL-18 was done by the use of ELISA kit for serum IL-18 (Myobiosource, France).

**Genotyping of TLR4 and NF-κB1-94 Polymorphisms:**

DNA Extraction was done by the use of QIAamp DSP DNA Blood Mini Kit uses QIAamp technology for purifying genomic DNA. Then, Design of TLR-4 Primers was done and Allele-specific PCR was performed in order to detect SNPs of TLR-4. The following primers (Forward primer TLR-4′-5′-CTTGCGGGTTCTACATCAA-3′, Reverse primer TLR-4 5′ AGTACCTGAAGACTGGAGAG-3′) were employed for detection of rs 4986790 (Asp299Gly) and for rs 4986791 (Thr399Ile).

Furthermore, Polymerase Chain Reaction amplifications were performed with the following temperature program: denatured at 94°C for 4 min followed by 30 cycles of denaturation at 94°C for 30 sec; annealing at 55°C for 45 sec; and extension at 72°C for 60 sec. A final extension incubation of 7 min at 72°C was included, followed by a10 min incubation at 4°C to stop the reactions.

Then the samples were loaded on agarose gel to perform electrophoresis using AgaroPower™. Moreover, PCR product were send for Sanger sequencing using ABI3730XL, automated DNA sequencer in Macrogen Company- Korea (http://dna.macrogen.com/eng). The sequences of these samples were matched with the source sequence and analyzed by using Basic Local Alignment Search Tool Program (BLAST), which is obtainable at the NCBI information site on the following website http://blast.ncbi.nlm.nih.gov/Blast.cgi.

**Results**

The demographic characteristics of 96 subjects included in the present study were presented in table (1)

<table>
<thead>
<tr>
<th></th>
<th>Chronic periodontitis group n=55</th>
<th>Control group n=41</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>35-50</td>
<td>30-50</td>
<td>0.502</td>
</tr>
<tr>
<td>Mean</td>
<td>38</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>7.24</td>
<td>8.24</td>
<td></td>
</tr>
</tbody>
</table>
Table 1: The demographic characteristics of groups.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>n 38</td>
<td>n 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% 69.09%</td>
<td>% 30.90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td>Positive n 9</td>
<td>Positive n 46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% 16.36%</td>
<td>% 30.90%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Negative n 38</td>
<td>Negative n 41</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>% 83.64%</td>
<td>% 100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Analytic statistics for serum IL-18 showed significant decrease in the medium of IL-18 in chronic periodontitis group compared to control group at p-value (0.032) with median (38.86pg/μl) for control group while it was (24.644pg/μl) for chronic periodontitis group as shown in table (2).

Table 2: Serum level of IL-18pg/μl in chronic periodontitis and control.

<table>
<thead>
<tr>
<th>Study groups</th>
<th>Chronic periodontitis</th>
<th>control</th>
<th>p-values</th>
<th>z-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>46</td>
<td>42</td>
<td></td>
<td>0.032*</td>
</tr>
<tr>
<td>Median</td>
<td>24.644</td>
<td>38.865</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>36.238</td>
<td>46.090</td>
<td>0.032*</td>
<td>1.836</td>
</tr>
<tr>
<td>SD</td>
<td>23.04</td>
<td>22.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>16.51-146.49</td>
<td>20.25-140.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Genetic analysis for TLR-4 showed two SNPs in TLR-4 according to primer design as illustrated in figure (1).

Analysis by Hardy-Weinberg equilibrium for study groups were done for the two SNPs. For rs 4986790 the equilibrium was non-significant in chronic periodontitis group while it was significant for control group and highly significant result was obtained in total sample while the results of equilibrium for rs 4986791 were non-significant for both chronic periodontitis, control groups and total samples as shown in table (3).
Table 3: Hardy-Weinberg equilibrium for study groups in rs 4986790 and rs 4986791 polymorphisms.

<table>
<thead>
<tr>
<th>rs 4986790 polymorphism</th>
<th>Chronic periodontitis n=55</th>
<th>Control n=41</th>
<th>Total n=96</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed n</td>
<td>expected n</td>
<td>observed n</td>
</tr>
<tr>
<td>A-A</td>
<td>54</td>
<td>54.0045</td>
<td>38</td>
</tr>
<tr>
<td>A-G</td>
<td>1</td>
<td>0.9909</td>
<td>2</td>
</tr>
<tr>
<td>G-G</td>
<td>0</td>
<td>0.0045</td>
<td>1</td>
</tr>
<tr>
<td>Hardy-Weinberg equilibrium</td>
<td>0.0046</td>
<td>9.23</td>
<td>14.152</td>
</tr>
<tr>
<td></td>
<td>P-value =0.999</td>
<td>P-value=0.029*</td>
<td>P-value= 0.002**</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>rs 4986791 polymorphism</th>
<th>Observed n</th>
<th>Expected n</th>
<th>observed n</th>
<th>expected n</th>
<th>observed n</th>
<th>expected n</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C-C</td>
<td>51</td>
<td>51.07</td>
<td>37</td>
<td>37.097</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>C-T</td>
<td>4</td>
<td>3.854</td>
<td>4</td>
<td>3.804</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>T-T</td>
<td>0</td>
<td>0.072</td>
<td>0</td>
<td>0.097</td>
<td>0</td>
</tr>
<tr>
<td>Hardy-Weinberg equilibrium</td>
<td>0.08</td>
<td>0.110</td>
<td>0.181</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-value =0.999</td>
<td>P-value=0.990</td>
<td>P-value =0.780</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Regarding, the SNPs number and distribution in both groups were illustrated in table (4) as there was one SNP in chronic periodontitis group for rs 4986790 and 3 SNPs in control group for the same rs with non-significant differences. On the other hand there were 4 SNPs in both chronic periodontitis group and control group at rs 4986791 with non-significant difference between them. Interestingly the effect of TLR-4 SNPs on chronic periodontitis distribution was assessed by counting the odd ratio and it was found (0.208) for rs 4986790 and the odd ratio for rs 4986791 was (0.637).

Table 4: the number of SNPs for TLR-4 in chronic periodontitis patients and control samples.

<table>
<thead>
<tr>
<th>TLR4</th>
<th>Chronic periodontitis</th>
<th>control</th>
<th>Fisher exact</th>
<th>P value</th>
<th>Odd ratio</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>rs 4986790</td>
<td>1</td>
<td>1.81%</td>
<td>3</td>
<td>7.31%</td>
<td>0.316</td>
<td>0.953</td>
</tr>
<tr>
<td>rs 4986791</td>
<td>4</td>
<td>7.27%</td>
<td>4</td>
<td>9.75%</td>
<td>0.720</td>
<td>0.867</td>
</tr>
</tbody>
</table>

OR: odd ratio, CI: confidence interval.

Moreover, using fisher exact test to find the genotype frequency of both SNPs in TLR-4 showed non-significant difference in their distribution in both groups as described in table (5), the study illustrate the effect of each genotype of TLR-4 SNPs on disease distribution and prevention. It was found that the genotype A-A had a higher odd ratio (4.263) than other genotype to develop disease in rs4986790. While the genotype C-C have (1.378) chance to develop disease in comparison with other genotype located in the rs4986791.
Table 5: Genotype frequency of TLR-4 SNPs.

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Chronic periodontitis</th>
<th>control</th>
<th>Fisher exact</th>
<th>p-value</th>
<th>Odd ratio</th>
<th>CI 95%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq.</td>
<td>n</td>
<td>Freq.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rs 4986790</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-A</td>
<td>54</td>
<td>0.981</td>
<td>38</td>
<td>0.926</td>
<td>0.309</td>
<td>0.85</td>
</tr>
<tr>
<td>A-G</td>
<td>1</td>
<td>0.018</td>
<td>2</td>
<td>0.048</td>
<td>0.575</td>
<td>0.75</td>
</tr>
<tr>
<td>G-G</td>
<td>-</td>
<td>0.000</td>
<td>1</td>
<td>0.024</td>
<td>0.426</td>
<td>0.81</td>
</tr>
<tr>
<td>rs 4986791</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C-C</td>
<td>51</td>
<td>0.927</td>
<td>37</td>
<td>0.902</td>
<td>0.720</td>
<td>0.68</td>
</tr>
<tr>
<td>C-T</td>
<td>4</td>
<td>0.072</td>
<td>4</td>
<td>0.097</td>
<td>0.720</td>
<td>0.68</td>
</tr>
<tr>
<td>T-T</td>
<td>-</td>
<td>0.000</td>
<td>-</td>
<td>0.000</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Considering the correlation of TLR-4 SNPs with clinical periodontal parameters: The current study found significant negative correlation between rs4986790 and rs 4986791 with plaque index, as illustrated in table (6).

Table 6: Correlation of rs 4986790 & rs4986791 with clinical periodontal parameters.

<table>
<thead>
<tr>
<th>Spearman correlation</th>
<th>PI</th>
<th>GI</th>
<th>PPD</th>
<th>CAL</th>
<th>BOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>rs4986790 Chronic periodontitis</td>
<td>r</td>
<td>-0.304</td>
<td>0.009</td>
<td>-0.058</td>
<td>0.103</td>
</tr>
<tr>
<td>control</td>
<td>p</td>
<td>0.027*</td>
<td>0.947</td>
<td>0.671</td>
<td>0.450</td>
</tr>
<tr>
<td>rs4986791 Chronic periodontitis</td>
<td>r</td>
<td>0.229</td>
<td>0.097</td>
<td>0.113</td>
<td>0.122</td>
</tr>
<tr>
<td>control</td>
<td>p</td>
<td>0.049*</td>
<td>0.476</td>
<td>0.404</td>
<td>0.369</td>
</tr>
</tbody>
</table>

Discussion

Periodontitis is a multifactorial disease and studies of animals and humans encourage the concept that a large number of genetic factors may be related with periodontitis and clearly have a role in periodontal diseases. The current work revealed a significant decrease in the levels of IL-18 in chronic periodontitis group, this result was in agreement with Chitrapriya et al (13-15) and this could be explained by: In health, a predominance of T cells, minimal B cells, a sophisticated network of professional antigen presenting cells (APC) guarding the gingival barrier (16). It has been documented that APCs and epithelial cells are the source of IL-18. APCs are present in larger numbers in clinically healthy and gingivitis when compared to periodontitis lesions.

The result of Hardyweinberg equilibrium for rs 4986790 was non-significant between the observed and expected genotypes in chronic periodontitis group while it was significant for control group and highly significant result was obtained in total sample. Furthermore, non-significant results was found between chronic periodontitis group and control group although,
the preventive fraction for rs 4986790 was high and this agree with (18), this could increase the chance that the rs 4986790 have protective role as it occurred in more frequency in control group than in periodontitis group. This improved by the negative strong correlation with plaque index that was found in the chronic periodontitis group.

The significant negative correlation with plaque index that was found in the chronic periodontitis group. This was explained by; this SNP is responsible for the change in interactions between TLR-4 present on immune cells and LPS affecting the survival rate of periopathogenes in gingival pockets. The TLR4 rs4986790 SNP significantly interacted with P. gingivalis in conferring a decreased risk of periodontitis and may be protective against alveolar bone height loss, a feature of periodontitis (19).

While the results of Hardy-Weinberg equilibrium for rs 4986791 were non-significant for chronic periodontitis and control groups as well as total samples and this in coincidence with (17). In this study, genotype and allele frequencies of the Thr399Ile polymorphisms in both groups of healthy and chronic periodontitis subjects showed no significant difference in TLR-4 rs 4986791 genotype frequencies.

Regarding the correlation of rs4986791 with clinical periodontal parameters, there was significant positive correlation between plaque index and SNP at rs 4986791, suggesting its association with initiation of periodontal disease. Nieto et al in (2014) (20) reported that polymorphisms have been shown to change the ligand-binding site of the receptor. They can modify the inflammatory response and promoting bacterial infections, furthermore, inhibition of components of the innate host defense system results in the lack of chemokines that normally guides leukocytes to the site of bacterial colonization. The local inhibition of these inflammatory mediators results in the lack of sufficient leukocytes to properly control dental plaque growth, proposed to be one of the major factors in the development of periodontitis (21,22). By this explanation we suspect that SNP in TLR-4 in rs4986791 cause inhibition in activity of TLR-4 which is important part of innate immune response and result in dental plaque growth.

In a conclusion of present study, dental plaque is responsible for initiation of periodontitis and its growth aggravated by suppression in the levels cytokine and SNP in TLR-4 at rs 4986791 while plaque growth was inhibited in rs 4986790. Furthermore, genetic polymorphisms in TLR-4 were not associated with the susceptibility of periodontitis in Iraqi patients. However, they might have an association with the clinical parameters and can modify severity of the disease. High frequencies of TLR-4 at rs4986790 in control group suggest that these alleles may confer protective effects against the disease or a low, weak susceptibility to periodontal disease.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


Evaluation of Students’ Knowledge, Practice and Attitudes Related to Antibiotics Use and Resistance in the Context of Iraqi Medical Education

Mohammed Abdul-Hassan Jabarah AL-Zobaidy
School of Nursing, University of Al-Qadisiyah, Iraq

Abstract

Inappropriate use of antibacterial drugs leads to emergence of multi-drug resistant bacteria and renders these agents useless. Raising awareness of medical and nursing students is critical for dealing with this progressive problem. Therefore, the aim of this study was to appraise knowledge, practice and attitudes concerning antibiotics use and resistance among medical and nursing students at University of AL-Qadisiyah, Iraq.

A descriptive cross-sectional questionnaire-based study involved 5th-year medical and 4th-year nursing students at University of AL-Qadisiyah in the 2017/2018 academic year. Data were collected using a structured questionnaire and presented as absolute numbers and percentages.

Participants of current study demonstrated reasonable level of knowledge, yet questionable attitudes and practice about antibiotics.

Knowledge about antibiotics has be translated into good attitudes and practice. Further education about prescription skills and control of infection is required.

Keywords: Knowledge, Attitudes, Practice, Antibiotics resistance, Medical, Nursing, Pharmacology, Microbiology.

Introduction

Immune-competent individuals can effectively deal with infections. However, those who are immune-compromised need antimicrobial drugs to defeat invading micro-organisms. Anti-bacterial drugs are either bactericidal or bacteriostatic. Also, they can be prescribed individually or in combination. However, their choice is governed by type of bacteria and their sensitivity to antibiotics, prescriber’s knowledge and practice, and patient’s characteristics (1).

Bacterial resistance to antibiotics is serious health problem worldwide apart from Iraq. It may result from irrational prescription, self-medication and overuse of antibiotics (2).

Interventions that change Knowledge, Practice and Attitudes (KAP) related to antibiotics use and resistance among doctors, dentists, pharmacists and nurses are essential to deal with this problem (3). Also, the best time for these interventions is during undergraduate training, because after graduation it will be difficult to change their beliefs, views and behaviours related to antibiotics (4).

The current undergraduate medical (6-year) and nursing (4-year) programmes at University of AL-Qadisiyah (UoQ) involve delivery of pharmacology and microbiology courses during 3rd year of these programmes. Given the practical differences between the two professions, the depth of pharmacology knowledge delivered for medical students is greater. Moreover, to the author’s best knowledge there is no previous study that had investigated KAP of antibiotics use and resistance among undergraduate students in the context of Iraqi medical education.

Taken together, current study was aimed at evaluating KAP of antibiotics use and resistance among 5th-year medical and 4th-year nursing students at UoQ, Iraq.
Materials and Method

A descriptive cross-sectional questionnaire-based study conducted at Medical and Nursing Schools/University of AL-Qadysia (UoQ), Iraq from December 2017 to February 2018. The target populations were 5th-year medical (104) and 4th-year nursing (118) students.

Ethical approval was obtained from the Ethics Committees in the two schools after addressing ethical implications of the study.

There were no exclusion criteria or incentives to participate in the study. However, active participation was encouraged by prior informing students that their participation is voluntary, anonymous, confidential and will not affect their academic progression. The questionnaires were administered to 96 medical and 100 nursing students by face-to-face interview and agreements of participants to fill in the questionnaires were considered a consent to take part in the study.

Following evaluation of relevant literature and questionnaires employed in comparable studies, a questionnaire was developed and critically appraised by a panel of experts in pharmacology and microbiology. Afterwards, it was piloted by being administered to 10 students from each school to establish its validity. The approved questionnaire covered Demographic characteristics of participants, Knowledge about antibiotics use, side effects and resistance, Attitudes towards use of antibiotics, Practice concerning antibiotics use and resistance, and the possible causes of bacterial resistance to antibiotics.

Data were analysed using descriptive statistics and presented as absolute numbers and percentages.

Results and Discussion

Demographic characteristics of participants

The response rates were good and numbers of female students, from both schools, who completed the questionnaires were higher than their male colleagues which reflects gender differences within each cohort (Table 1). The reported response rates might because that students were informed in advance of the study that their participation is anonymous, voluntary and will not affect their academic progress. However, novelty of study might have adversely influenced students’ responses.

Previous studies had reported similar response rates. However, other studies reported a response rate of up to 100%.

Table 1: Demographic characteristics of participants

<table>
<thead>
<tr>
<th>Variables</th>
<th>5th-year Medical programme</th>
<th>4th-year Nursing programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target population</td>
<td>104</td>
<td>118</td>
</tr>
<tr>
<td>Number of female students (%)</td>
<td>66 (63)</td>
<td>70 (59)</td>
</tr>
<tr>
<td>Number of male students (%)</td>
<td>38 (37)</td>
<td>48 (41)</td>
</tr>
<tr>
<td>No. of participants</td>
<td>96</td>
<td>100</td>
</tr>
<tr>
<td>No. of respondents</td>
<td>69</td>
<td>63</td>
</tr>
<tr>
<td>Response rate (%)</td>
<td>70.9%</td>
<td>63%</td>
</tr>
<tr>
<td>No. of female respondents (%)</td>
<td>42 (60.8)</td>
<td>38 (60.3)</td>
</tr>
<tr>
<td>No. of male respondents (%)</td>
<td>27 (39.2)</td>
<td>25 (39.7)</td>
</tr>
<tr>
<td>Age range (average)/yr</td>
<td>21-26 (23.5)</td>
<td>20-26 (23)</td>
</tr>
</tbody>
</table>

Knowledge about antibiotics use and resistance

In general, participants from nursing school had reasonable level of knowledge concerning antibiotics use and resistance (Table 2) which was comparable to that of medical students. However, the latter were expected to be better owing to the depth and breadth at which microbiology and pharmacology subjects are explored in medical curriculum. Also, medical students learn about antibiotics during their clinical placements while nursing students do not have such opportunity.
Table 2: Knowledge about antibiotics’ use and resistance

<table>
<thead>
<tr>
<th>Questions</th>
<th>5th-year Medical programme (n=69)</th>
<th>4th-year Nursing programme (n=63)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. *</td>
<td>%</td>
</tr>
<tr>
<td>There are bacteria in human body which are useful for our health</td>
<td>63</td>
<td>91.3</td>
</tr>
<tr>
<td>Antibiotics can be used to cure infections caused by bacteria</td>
<td>53</td>
<td>76.8</td>
</tr>
<tr>
<td>Antibiotics can be used to cure infections caused by viruses</td>
<td>21</td>
<td>30.4</td>
</tr>
<tr>
<td>Antibiotics can kill useful bacteria present in human body</td>
<td>50</td>
<td>72.5</td>
</tr>
<tr>
<td>The use of antibiotics will speed up the recovery of cold, cough and allergic rhinitis</td>
<td>35</td>
<td>50.7</td>
</tr>
<tr>
<td>Antibiotics are obtainable without interference of a doctor i.e. antibiotics are over-the-counter drugs</td>
<td>34</td>
<td>49.3</td>
</tr>
<tr>
<td>I have heard of bacterial resistance to antibiotics</td>
<td>61</td>
<td>88.4</td>
</tr>
<tr>
<td>In particular, I have discussed the problem of bacterial resistance to antibiotics during degree courses</td>
<td>47</td>
<td>68.1</td>
</tr>
<tr>
<td>Antibiotics can cause allergic reactions</td>
<td>59</td>
<td>85.5</td>
</tr>
<tr>
<td>The frequent use of antibiotics will decrease the efficacy of treatment when using the antibiotic again</td>
<td>39</td>
<td>56.5</td>
</tr>
<tr>
<td>Additional burden of medical cost to the patient</td>
<td>52</td>
<td>75.4</td>
</tr>
<tr>
<td>Emergence of bacterial resistance</td>
<td>57</td>
<td>82.6</td>
</tr>
<tr>
<td>Exacerbation or prolongation of illness</td>
<td>52</td>
<td>75.4</td>
</tr>
<tr>
<td>Ineffective treatment</td>
<td>58</td>
<td>84.1</td>
</tr>
</tbody>
</table>

* Numbers of medical and nursing students who answered with “True”.

Regarding economic and medical consequences of inappropriate use of antibiotics, nursing students expressed reasonable, but medical students showed better, level of knowledge about these consequences. These different levels of knowledge expressed by our participants might be attributed to their diverse academic abilities, enthusiasm to learn and their practical talents.

Previous studies reported reasonable level of knowledge concerning antibiotics use and resistance among medical students whereas other studies reported average to good level of knowledge among nursing students.

Inadequate knowledge about antibiotics’ indications, adverse effects and bacterial resistance will pave the way for inappropriate prescription, random use of antibiotics with consequent emergence of bacterial resistance.

In traditional medical and nursing programmes there is fragmentation of knowledge and poor application of
basic knowledge for solving patients’ clinical problems (13). Also, it is possible that our participants did not receive sufficient education regarding the variables considered in current study. The latter may include little emphasis on infection control and making inadequate awareness about the problem of antibiotics resistance.

**Causes of bacterial resistance to antibiotics**

Participants from both cohorts showed comparable views regarding these causes (Table 3). “Unrestricted use of antibiotics” was viewed 73.9% of medical students as the most significant cause of this problem whereas 84.1% of nursing students thought that “consumption of antibiotics for treatment of self-limiting infections” is the most significant cause. Also, our participants showed careful and comparable awareness of the other causes of this problems (Tables 3).

The causes of bacterial resistance to antibiotics considered in current study have been strongly acknowledged worldwide as leading causes in the emergence of multi-drug resistant strains of microorganisms (2,6,7,14).

**Table 3: Possible reasons of bacterial resistance to antibiotics**

<table>
<thead>
<tr>
<th>Causes of bacterial resistance</th>
<th>Medical students (n=69)</th>
<th>Nursing students (n=63)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No*</td>
<td>%</td>
</tr>
<tr>
<td>Empirical antibiotic therapy (best guess therapy)</td>
<td>43</td>
<td>62.3</td>
</tr>
<tr>
<td>Excessive antibiotic use in live stock (Animals brought up for food)</td>
<td>36</td>
<td>52.2</td>
</tr>
<tr>
<td>Lack of restrictions on antibiotic usage</td>
<td>51</td>
<td>73.9</td>
</tr>
<tr>
<td>Mutational and evolutionary changes in the bacteria</td>
<td>49</td>
<td>71.0</td>
</tr>
<tr>
<td>Poor measures for control of infection</td>
<td>46</td>
<td>66.7</td>
</tr>
<tr>
<td>Use of antibiotics for longer than standard duration</td>
<td>37</td>
<td>53.6</td>
</tr>
<tr>
<td>Use of antibiotics for self-limited bacterial infections</td>
<td>43</td>
<td>62.3</td>
</tr>
<tr>
<td>Use of antibiotics for shorter than standard duration</td>
<td>36</td>
<td>52.2</td>
</tr>
<tr>
<td>Use of antibiotics with a broader than necessary spectrum</td>
<td>41</td>
<td>59.4</td>
</tr>
</tbody>
</table>

* Numbers of medical and nursing students who answered with “Yes”.

**Attitudes related to antibiotics use and resistance**

Our participants expressed comparable attitudes concerning safe use of antibiotics (Table 4), as >90% of them acknowledged that the problem of antibiotics resistance is a genuine problem in Iraq. Subjects of other studies worldwide stated that antibiotics resistance is an actual problem in their own countries (6-8).

In addition, >85% of participants (Table 4) believed that the most important reason behind emergence of multi-drug resistant bacteria is irrational consumption of antibiotics. Also, 65-67% of them (Table 4) admitted that bacterial resistance to antibiotics emerges as the rate of antibiotics consumption increases. These perceptions were similarly expressed by subjects of other studies worldwide (5-9).

Despite that, 57-61% of our participants thought that residual antibiotics can be re-used (Table 4). In fact, approximately 49-59% of them did by self-medication and for mild self-limiting conditions. Indeed, these figures are higher than the 17.7% and 20% reported by in other studies (5,6), respectively.

Moreover, nearly 33-46% of our participants believed that use of combined antibiotics reduce their adverse effects (Table 4). Physicians who support this idea think that “the more it is, the better it is” (15). However, such mistaken idea can strongly abolish the
efforts to protect the community from multi-drug resistant bacteria. Moreover, socio-cultural factors and feelings of self-confidence (16) might explain the beliefs of our participants.

Table 4: Attitude related to antibiotics use and resistance strongly agree.

<table>
<thead>
<tr>
<th>Question</th>
<th>5th-year Medical programme (n=69)</th>
<th>4th-year Nursing programme (n=63)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I keep leftovers antibiotics at home because they might be useful in the future</td>
<td>42 60.9</td>
<td>36 57.1</td>
</tr>
<tr>
<td>I use leftovers antibiotics when you have cold, sore throat or flu without consulting your doctor</td>
<td>34 49.3</td>
<td>37 58.7</td>
</tr>
<tr>
<td>Adverse effects of antibiotics are reduced by using more than one drug at a time</td>
<td>23 33.3</td>
<td>29 46</td>
</tr>
<tr>
<td>Bacterial resistance to antibiotics is a problem in Iraq</td>
<td>64 92.8</td>
<td>57 90.5</td>
</tr>
<tr>
<td>The abuse of antibiotics is the main cause of bacterial resistance</td>
<td>59 85.5</td>
<td>58 92.1</td>
</tr>
<tr>
<td>Whenever I take an antibiotic, I contribute to the development of antibiotic resistance</td>
<td>39 56.5</td>
<td>42 66.7</td>
</tr>
</tbody>
</table>

Common practice of antibiotics use

Results of current study revealed that 72.5% and 88.9% of medical and nursing participants, respectively, always commenced antibacterial chemotherapy without medical consultation. Also, 31.9% and 38.1% medical and nursing participants, respectively, terminated their antibacterial treatment prematurely. Previous studies revealed that nearly 30% (7) and 64.3% (17) of their participants always started antibacterial chemotherapy without seeking medical consultation. Also, early stopping of antibacterial chemotherapy was practiced by 20% and 60% of participants in studies conducted in Jorden (18) and India (6), respectively. On the other hand, studies conducted by (6) reported that >90% of their participants always sought professional advice before starting antibacterial chemotherapy and they completed their courses of antibiotics.

On the other hand, 26.1% and 31% of medical and nursing students, respectively, stated that Iraqi doctors do prescribe antibacterial agents for treatment of common cold. It is well-stressed in medical education that bacteria are not responsible for common cold, however, such practice may reflect poor adherence to prescription guidelines (14). The latter places another obstacle on the way towards prevention of bacterial resistance to antibiotics.

Moreover, current study showed that 88.9%, 65.1% and 44.4% of nursing students used antibacterial drugs for acute bronchitis, common cold or fever, respectively, while 15.9%, 7.2% and 23.2% of medical students used such drugs for treatment of these conditions, respectively, (Table not shown).

Previous study (7) showed that 42.03% and 57.24% of participants had used antibacterial drugs for common cold and fever, respectively. Similar data were reported by (6), too. However, in another study (5) only 1% of participants had practiced so.

Malpractice regarding antibiotics use by our participants maybe because the traditional medical and nursing programmes do not give them the opportunity to apply their basic knowledge for solving patients’ clinical problems. In addition, traditional assessment methods focus on evaluating factual knowledge with little emphasis on assessment of skills like prescription skills (13).
Participation rates in current study were good despite that its originality in the context of UoQ. However, recruitment of students from early stages of the two programmes could help evaluate the impact of microbiology and pharmacology courses on students’ KAP.

**Conclusions**

Current study revealed that medical and nursing students at UoQ have reasonable level of knowledge about antibiotics use and resistance, however, their relevant attitudes and practices are questionable. Medical and nursing students in the undergraduate level need to be presented with topics related to prescription skills and control of infection.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**Acknowledgement:** The author is very thankful to all participants and to the Ethical Review Committees for their approval.

**References**

14. Harden RM, Sowden S, Dunn WR. Some educational strategies in curriculum development. The SPICES


Seroprevalence of Cytomegalovirus and Toxoplasma gondii in Infected Women in Babylon Province

Safaa A.AL-Isawi¹, Muhamed Ali Al Kabe², Ameer Kadhim Hussein³, Zaytoon A. Al-Khafaji³

¹Al furat AL-Awsat technical University/Institute Babylon technic/Iraq, ²Wasit University - Faculty of Medicine/Iraq, ³University of Babylon - Collage of Medicine/Iraq

Abstract

**Background:** This study was amid to estimate the occurrence of cytomegalovirus and toxoplasmosis infections in pregnant women with history of repeated abortion i.e.; bad obstetric history in Babylon Governorate. In addition to clarify the impact of the age of the women and the place of domicile on the incidence of those agents among the study group. **Methods:** The research involved (559) serum samples were collected from pregnant women with positive cytomegalovirus (CMV) and Toxoplasma gondii, those women were attending Babylon hospital /department of Obstetrics & Gynecology, who were complaining from single or more attacks of abortions. Crummy obstetric history and (50) normal women with previous normal full term deliveries. The study carried out by serological evaluation by VIDAS technique to detected IgG antibody. **Results:** There were no significant differences between means of age by CMV infection Mean ± SD 25.78 ± 6.44, while there were significant differences between means of age by Toxoplasma infection Mean ± SD 27.75 ± 6.07. Positive Cytomegalovirus infection represent about (97.7%) of study sample. Positive Toxoplasmosis represent only (28.6%) of study sample.

**Key word:** CMV, Toxo, Toxoplasma gondii ; Cytomegalovirus ; women; Abortion.

Introduction

Abortion is defined as termination of pregnancy resulting in dismissal of an immature fetus. A fetus of less than twenty weeks pregnancy or a fetus weighting less than 500 gm. is considered an abortus Number of maternal contagions can lead to a single or recurring pregnancy loss, including:

Human Cytomegalovirus (HCMV) infection is the most common cause of congenital malformation in developed countries, its clinical manifestations range from asymptomatic infection to severe fetal damage¹. CMV will lead to intricate pregnancies. It was been reported that the risk of fetal hurt is greater if the primary infection occurs during the first trimester of pregnancy (²). The placenta and the fetus can be infected either by transplacental transmission or by an ascending infection from the vagina (³,⁴).

Toxoplasmosis which is a systemic illness caused by the protozoan Toxoplasma gondii (T.gondii) infection that acquired by pregnant women through ingestion of cysts, undercooked meat or oocyst that may pollute soil, water, and food. Meat (primarily pork and lamb) is an main source of the infection in humans (⁵,⁶).

The infection has a global distribution. About one-third of humanity had been exposed to this parasite, but seroprevalence differs seriously between countries (less than 10% to more than 90%) and population group (⁷).

T.gondii infection in healthy subject is asymptomatic but in immune compromised patients may have grave disease (⁸).

Toxoplasmosis and CMV infection parts many features ,they most important way of transition and most these infection are asymptomatic and the adult who are infection with T.gondii and CMV are usually have self- limited symptom and usually develop an immune response represented by antibody agent , there for determination the IgM and IgG antibody agent is the

**DOI Number:** 10.5958/0976-5506.2019.00949.5
best ways to diagnosis these infection early (9&10). So present study aimed to estimate the incidence of cytomegalovirus and toxoplasmosis infections in pregnancy abortion in females with bad obstetric history.

Materials and Method

The study was conducted since January (2015) till August (2016), A total of (559) sera samples were collected for the detection of the Blood collection and serological tests. Each subject had 5 ml of whole blood collected by venipuncture in plain tubes; Sera were separated and stored in small screw caped vials at -20°C until serological analysis (11) Samples were screened for the presence IgG antibodies against HCMV and T. gondii, by VIDAS technique kit according to the manufactures instruction.

Statistical Analysis

Statistical analysis was carried out using SPSS version 20. Categorical variables were present as frequencies and percentages. Continuous variables were present as (Means ± SD). Independent sample t-test was used to compare potential between two groups. Pearson’s chi square ($X^2$) and Fisher-exact test were used to discover association between categorical variables. A $p$-value of $\leq 0.05$ was considered as significant.

Results

The Distribution of Patients According to Socio-demographic Characteristics the Association between CMV infection and Residence

Table 1 shows the association between CMV infection and residence. There was no significant association between CMV infection and residence.

<table>
<thead>
<tr>
<th>Study variables</th>
<th>CMV infection</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>144 (26.4)</td>
<td>6 (46.2)</td>
</tr>
<tr>
<td>Rural</td>
<td>402 (73.6)</td>
<td>7 (53.8)</td>
</tr>
<tr>
<td>Total</td>
<td>546 (100.0)</td>
<td>13 (100.0)</td>
</tr>
</tbody>
</table>

*p value $\leq 0.05$ was significant. Fisher-exact test.

The Association between Toxoplasmosis infection and Residence:

Table 2 shows the association between Toxoplasmosis infection and residence. There was significant association between Toxoplasmosis infection and residence.

<table>
<thead>
<tr>
<th>Study variables</th>
<th>Toxoplasmosis</th>
<th>$X^2$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>24 (15.0)</td>
<td>126 (31.6)</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>136 (85.0)</td>
<td>273 (68.4)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Total</td>
<td>160 (100.0)</td>
<td>399 (100.0)</td>
<td></td>
</tr>
</tbody>
</table>

*p value $\leq 0.05$ was significant. Fisher-exact test.
The Distribution of Patients According to Cytomegalovirus Infection:

Figure 1 shows the distribution of patients according to Cytomegalovirus Infection. Positive Cytomegalovirus infection represent about (97.7%) of study sample.

![Figure 1: The distribution of patients according to Cytomegalovirus Infection](image)

The Distribution of Patients According to Toxoplasmosis:

Figure 2 shows the distribution of patients according to Toxoplasmosis. Positive Toxoplasmosis represent only (28.6%) of study sample.

![Figure 2: The distribution of patients according to Toxoplasmosis](image)

Mean Differences of Age According to CMV and Toxoplasma Infections:

Table 2 shows mean differences of age according to CMV and Toxoplasma infections. There were no significant differences between means of age by CMV infection, while there were significant differences between means of age by Toxoplasma infection.

![Table 2: The mean differences of age according to CMV and Toxoplasma infections](image)

Discussion

Results are show in Table 1 give high significant incidence of C.M.V and Toxoplasmosis infection among aborted women who lived in rural areas than in those lived in urban area this finding is in agreement with other studies (12,13,14) who back reason it to direct contact for pregnant women in rural area with domestic animal on the one hand and consumption for their product directly without sterilization of the other hand, So all of them were in contacted with soil that may be heavily contaminated with oocytes which is sourced from the large number of animal in those area (15). In this study the VIDAS technique was chosen for determined time of infection: a positive IgG result usually indicates
infection at least six months previously. In this study Cytomegalovirus was appeared with rate 97.7% which is disagreement with (16). The seroprevalence of CMV is vary in the worldwide (17). In developed countries the apositivity of HCMV ranges between 30-90% of human population, and the increasing of prevalence is parallel with the age (18). In Iraq, many studies conducted to detect the sero positivity of CMV in aborted women, and the seropositivity of CMV in AL-Anbar province was 6.1% (26), in waste province was 60.2% (13), in Baghdad province was10% (27),15.7% (14), 9.3% (26), and in sulimania province was 9.18% (27). Risk factors for CMV infection was correlated with the socioeconomic status within a community (19, 20). Some studies experiential that the accumulation of cytotoxic T lymphocytes (CD28 effector) in elderly persons provided protection against symptomatic CMV disease. This study found Toxoplasmosis represent only (28.6%) of study sample It’s an agreement with (21,22) which described that the seroprevalence of toxoplasmosis was decreased This decline could be probably related to a decrease in the frequency of transmission of the parasite telluric where contact with soil was the greatest risk factor associated with T. gondii infection Moreover, improved lifestyle including food hygiene can contribute positively to the decline in toxoplasmosis prevalence. The maximum number of positive cases for CMV and T.gondii antibody antibody was related to abortion. This may be due to the fact that primary infection with Cytomegalovirus and Toxoplasma gondii and in pregnant women can lead to adverse outcome, which is initially unapparent or asymptomatic and thus difficult to diagnose on clinical grounds (25). So the parasite remain in latent state and again when the mother become pregnant where her immunity suppressed due to certain physiological changes in the body that occur during pregnancy, the parasite will reactivated and become the cause of her next abortion unless the treatment is received (24, 25), Table 3and 4 show the prevalence of IgG antibodies in our study population increased with age .These results statistically significant (p <0.05) were already observed in 2007 by El Mansouri et al. (2007). Similar observation has been advanced by Berger et al in France who reported that toxoplasmosis infection increases linearly with age (26) This can be explained by the increase of exposure to infection sources throughout life. This finding relatively analogous with (27,28).

**Conclusion:** The present study demonstrates a strong association between the infectious agents Cytomegalovirus (CMV) and the (Toxoplasma gondii) and abortion in women. It is therefore, recommended that all antenatal cases with such Past should be regularly screened for these alternatives (IgM and IgG) antibodies.

**Acknowledgment:** The authors acknowledge the members and staff of Babylon Teaching Hospital for Maternity and Children in In Babylon province for helping in collecting the samples, data and their excellent technical assistance. Authors also thank all patients who participated in this study

**Ethical Clearance:** The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding.

**References**

7. AL Azawi B.M. and AL-Waeli F.M.S. Studies on the effect of infected cases of parasite Toxoplasma gondii on some sex hormones. World Journal of


13- Colugnati F.B staras S.A. and Dollar S. C Incidence of cytomegalovirus infection among the general population and among pregnant women in the united states. BMC infection Dis. 2007;71-78.


A Comparative Study of Histopathological and Immunohistochemical Expression of MCM3 and MMP-2 in Pleomorphic Adenoma of Major and Minor Salivary Glands

Zena A. Husein¹, Ban F. Al - Drobie¹, Bashar H. Abdullah¹

University of Baghdad, IRAQ

Abstract

Pleomorphic adenoma (PA) is the most common salivary gland tumor, it shows remarkable degree of morphological diversity and biological controversy. This study was undertaken to compare the proliferation and invasion potentials between major and minor salivary pleomorphic adenoma using MCM3 and MMP-2 biomarkers respectively with correlation to PA subtypes and components. Thirty two paraffin blocks of PA (15 affecting major SGs and 17 were arising in minor SGs) were included in this study and examined in detail for their histomorphological features. Immunohistochemical expression of MCM3 and MMP-2 of the two groups was analyzed. PA of major SGs showed a significantly higher expression of proliferation marker (MCM3) than PA affecting minor SGs (P = 0.01). Although not significant, higher expression of MMP-2 was found in PAs arising in minor SGs (P = 0.09). Moreover, significant invers correlation was observed between MCM3 protein and plasmacytoid cell type in minor gland cases (P = 0.023).

Keywords: Pleomorphic adenoma . MCM3; MMP-2 . Major salivary glands. Minor salivary glands.

Introduction

Pleomorphic adenomas are the most common SGs tumors. It is a benign neoplasm but some types occasionally have malignant microscopical features or behave in a malignant manner like metastasis. PA is typically a well-circumscribed, encapsulated tumor. However, the capsule may be incomplete or show infiltration by tumor cells. The tumor composed of epithelial and myoepithelial cells arranged in a great variety of morphological patterns, with areas of mesenchymal differentiation. Clinical and histologic differences between major and minor salivary gland PAs have been partially explained by anatomical differences between these sites. However, this study was conducted to compare some aspects of the biological behavior between major and minor salivary glands PAs in relation to their histological patterns through the expression of MCM3 marker of cell proliferation and MMP-2 for local invassivness.

MCMs is a recently accepted proliferating marker, with its expression tightly associated with the cell cycle and cell-cycle initiation and are expressed throughout the whole cell cycle including cells leaving G0 to enter into the early G1 phase, and therefore MCM proteins specifically MCM3 has been proposed as a novel proliferation marker in SGs tumors.

MMP-2 is a member of matrix metalloproteinases; a family of structurally related, zinc containing enzymes. It degrades type IV collagen, which been thought to be key enzyme in tumor progression. MMP-2 overexpression have been reported in a variety of salivary gland tumors. Localization of MMP-2 protein by immunohistochemical method have been reported in tissue sections of PA, nevertheless, PA progression and/ or development difference in major and minor salivary glands is still undetected.

The goal of this study is to gain understanding of the differences in biological behavior between major and minor salivary glands PAs through MCM3 and MMP-2 proteins expression with respect to histological parameters.
Materials and Method

Sequentially accessioned samples of major gland and minor gland PAs were selected from the archives of the oral and maxillofacial pathology Department, College of Dentistry, Baghdad University between the period 1990 and 2016. Slides were reviewed and diagnosis confirmed by two oral pathologist. There were 15 major gland PAs and 17 minor gland PAs that were of quality and size for study inclusion.

The tumors could be classified into stoma-rich, classic and cell-rich types depending on the amount of stroma and the proportion of cellular components. The evaluated microscopic features included the following: (1) tumor capsule (complete, incomplete, absent), (2) tumor cell types (plasmacytoid, spindle, clear, squamous, basaloid, cubic, oncocytoid and mucous cells), (3) epithelial architecture (ductal, trabecular, solid, cystic), (4) stromal component (myxoid, hyaline, chondroid or calcified tissue).

Immunohistochemistry

Five-micrometer tissue sections were deparaffinized and stained by means of a standard immunohistochemically technique using a high-temperature water bath for antigen retrieving. Abcam Expose Mouse and Rabbit HRP/DAB was used which is a biotin free immunoenzymatic antigen detection system. The sections were incubated with the following antibodies: anti-MCM3 (Monoclonal; Abcam; dilution 1:250) and anti-MMP-2 (Polyclonal; Abcam; dilution 1:500). Human tonsil tissue and neurofibroma section were used as positive controls for MCM3 and MMP-2 respectively. A negative control was obtained by not including the primary antibody.

MCM3 and MMP-2 immunoreactivity was semi-quantitatively evaluated in ten microscopic fields at high magnification (X400). The percentage of positive tumor cells out of 1000 tumor cells was considered the labelling index (LI) of each marker.

Statistical Analysis

Data were analyzed using SPSS version 27.0 software (SPSS, Inc., France). For comparison of MCM3 and MMP-2 expression between the study groups, the Mann-Whitney U-test was used. Associations between MCM3, MMP-2 expression and histopathological features were verified by Pearson’s Chi-square or Fisher exact test. Correlation between MCM3, MMP-2 and cellular components was performed, using pearson’s correlation test. 0.05 significance level was set for all statistical tests.

Results

Histological features

In this study, cell-rich, stroma-rich and classic subtypes of PA had an equal frequencies in major gland cases. The majority of minor gland cases (58.8%) were cell-rich and there was no stroma-rich PA. More than half (66.7%) of the major gland cases were partially encapsulated, while partial encapsulation was observed in all of the minor gland PAs (table 1).

Both tumor site showed diverse cells types although plasmacytoid followed by spindle cells were the most frequent types. The distribution of cellular components is presented in Tables 3 and Fig. 1. Stromal element on both major and minor gland PA had a very large variety of subtypes, although the myxoid stroma being the most frequent in both tumor sites. Ductal structures, trabecular and solid architectures, and cystic spaces were also observed and their distribution is presented in Table 2 and Fig. 1.

<table>
<thead>
<tr>
<th>Histopathological features</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA subtype</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cell-rich</td>
<td>5 (33.3)</td>
<td>10 (58.8)</td>
<td>0.05*</td>
</tr>
<tr>
<td>Stroma-rich</td>
<td>5 (33.3)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Classic</td>
<td>5 (33.4)</td>
<td>7 (41.2)</td>
<td></td>
</tr>
</tbody>
</table>
Table 1  Relative and absolute distribution of the histopathological findings of pleomorphic adenoma in major and minor salivary glands

<table>
<thead>
<tr>
<th>Capsule</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete</td>
<td>4(26,7)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial</td>
<td>10 (66.7)</td>
<td>17 (100)</td>
<td></td>
<td>0.01 *</td>
</tr>
<tr>
<td>Absent</td>
<td>1 (6)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15 (100)</td>
<td>17 (100)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Epithelial pattern

<table>
<thead>
<tr>
<th>Ducts</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14(93)</td>
<td>16(94)</td>
<td></td>
<td>0.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trabeculae</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13(87)</td>
<td>10(59)</td>
<td></td>
<td>0.07</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Solid</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9(60)</td>
<td>16(94)</td>
<td></td>
<td>0.01 *</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cysts</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7(47)</td>
<td>9(53)</td>
<td></td>
<td>0.7</td>
</tr>
</tbody>
</table>

Stromal components

<table>
<thead>
<tr>
<th>Myxoid</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14(93)</td>
<td>17(100)</td>
<td></td>
<td>0.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chondroid</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12(80)</td>
<td>9(53)</td>
<td></td>
<td>0.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hyalinized</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9(60)</td>
<td>12(71)</td>
<td></td>
<td>0.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Calsification</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
<th>χ²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1(7)</td>
<td>2(12)</td>
<td></td>
<td>0.5</td>
</tr>
</tbody>
</table>

* results are statistically significant

Table 2 Histomorphological features of cellular components in pleomorphic adenoma (PA)

<table>
<thead>
<tr>
<th>TUMOR CELL</th>
<th>Major salivary gland cases n(%)</th>
<th>Minor salivary gland cases n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>&lt; 30 %</td>
</tr>
<tr>
<td>Plasmacytoid</td>
<td>0 (0)</td>
<td>4 (27)</td>
</tr>
<tr>
<td>Spindle</td>
<td>0 (0)</td>
<td>8 (53)</td>
</tr>
<tr>
<td>Cuboidal</td>
<td>4 (27)</td>
<td>10 (67)</td>
</tr>
<tr>
<td>Basaloid</td>
<td>4 (27)</td>
<td>7 (47)</td>
</tr>
<tr>
<td>Squamous</td>
<td>5 (33)</td>
<td>10 (67)</td>
</tr>
<tr>
<td>Clear</td>
<td>11 (73)</td>
<td>3 (20)</td>
</tr>
<tr>
<td>Oncocytce</td>
<td>14 (93)</td>
<td>1 (7)</td>
</tr>
</tbody>
</table>

MCM3 Protein

The examined cases of PA showed diffuse total cell reactivity with different nuclear intensity (Fig.2 ). In the majority of the minor gland PA cases, negative or low expression of MCM3 was observed in the nuclear tumor cells and the labeling index(mean ±SD = 6.4±6.48). Cases affecting major salivary glands were found to have higher MCM3 reactivity and the labeling index (mean ±SD = 35.22±31.52). Significant difference was found between these two groups of tumors (P = 0.01). Among histopathological variables, plasmacytoid cell type correlated inversely with MCM3 expression ( P = 0.023) in minor gland cases only.

MMP-2 Protein

Immunexpression of MMP-2 was detected in both epithelial-myoepithelial and stromal components (Fig.3). Greater number of the minor gland PA cases
had moderate or high expression of MMP-2 observed in the tumor cells cytoplasm and the labeling index (mean±SD= 54±21). In major gland tumor, the MMP-2 reactivity was slightly lower than that in minor salivary gland PA and the labeling index (mean±SD= 47±23). No significant difference was found between these two groups of tumors (P = 0.09).

Figure 1 Histopathological features of the pleomorphic adenoma (PA). (A) plasmacytoid cells, (B) spindle cells, (C) ductal structures, (D) cystic spaces, (E) myxoid stroma, (F) chondroid stroma, (G) hyaline stroma, (H) trabecular pattern, (I) squamous metaplasia, (J) osteoid tissue, (K) lipomatous metaplasia, (L) stroma-rich PA

Figure 2 Immunoexpression of MCM3 protein in cell nuclei of pleomorphic adenoma (A) moderate expression (B) high expression

Figure 3 Immunoexpression of MMP-2 protein in pleomorphic adenoma (A) Ductal structures (B) tumor cell sheets (C) squamous cells (D) chondroid stroma
Discussion

Salivary gland neoplasms display fluctuating clinical behavior and morphological characteristics. Particular interest has been directed to salivary pleomorphic adenoma, due not only to its frequency, but also to its histopathological diversity and biological behavior controversy (18, 19). Histological differences between major and minor salivary glands

PAs have been reported (7, 20), in addition, series of prospective studies suggested that aggressive tumor behavior like recurrence potential and malignant transformation was more likely to be associated with certain histological findings (13, 18). In this retrospective study, we attempted to compare the influence of histological variation of PA on its proliferation and invasion potentials through MCM3 and MMP-2 biomarkers respectively between major and minor glands PAs.

In various studied conducted, the universal agreement is that the PAs of minor salivary glands are often more cellular than their counterparts in the parotid (21, 22). Our samples demonstrated similar findings. All minor glands PAs and 66.7% of major gland cases in our study were partially encapsulated. In the literature, 54-100% rate of occurrence of partial encapsulation in minor glands PA has been described (7, 20, 23), and a relatively high proportion of major glands PAs are encapsulated (3, 7, 24). However, it has been proved that area of capsular deficiency were seen in all cases when tumors were serially sectioned (25).

The epithelial and myoepithelial cells of PA show a remarkable degree of morphological diversity in both tumor sites (25). Plasmacytoid is the most frequent and predominant type followed by spindle cell in both tumor sites. Ellis and Auclair (18) thought that these neoplastic cells appear to be in transformation from one profile to the other, too many, the plasmacytoid cells are highly characteristic of a PA and almost never found in other salivary gland tumors (26). Although some studies reported that trabecular pattern as most frequently encountered followed by ductal pattern (4, 21), however, the ductal epithelial pattern was the most frequent type in both tumor sites in the present study, similar to was reported in (5, 17, 20, 22). In concordance with our findings in both major and minor glands cases, series of studies showed that myxoid followed by chondroided were the most frequently encountered stromal types in PA (27).

Regarding MMP-2, higher but not significant expression of MMP-2 protein was found in minor salivary glands PAs compared to major glands ones, with all but one case of PA in both groups expressed MMP-2. This MMP along with MMP-9 reported to be related to invasive properties and malignant potential of salivary gland tumors (12). Therefore, it is likely that major and minor gland PAs are still comparable in term of local invasion potential as measured by MMP-2 protein due to small sample size, or there is other than MMP-2 contributing to PA local invasiveness.

Conclusion

Although the biological behavior of major and minor gland PAs were comparable in term of local invasiveness, however, major gland PA had higher proliferation propensity than minor glands ones with this proliferative activity suggested to be attributed to plasmacytoid myoepithelial cells.

Conclusion

Compared to PAs of major glands, PAs affecting minor SGs have lower proliferation potential and comparable invasion propensity as measured by MCM3 and MMP-2 respectively. Further, cellular components-in particular plasmacytoid type- has the potential to play a more important role in biological behavior of this tumor.

Ethical clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding.

References


Study of the Effect of Some Trace Elements (Calcium) and Some in the Biochemical Variables on the Children of Thalassemia Patients in the Province of Maysan/ Iraq

Farah Majbali jabber
College of Pharmacy – University of Maysan/Iraq

Abstract

The study was conducted to measure the concentration of trace elements of calcium and some enzymatic biochemical parameters for a number of people with thalassemia in Masan Governorate. The study included 50 patients between the ages of (1-14) years (13 males and 19 females) from Thalassemia Center and Hematology. (16 males and 14 females) during the period from January 2018 and the end of March 2018. Patients were divided into three age groups (1-4 years), the second group (5-9 years), the third group (10-14 years). The variables were studied based on age, sex, thalassemia type, and genetics. The results showed that most cases of the disease are of the type of Thalassemia major and that the proportion of males is greater than females. In addition, a decrease in the calcium concentration of patients compared to controls. The concentration of calcium for patients (8.9 ± 0.47) compared to control (9.5 ± 0.6).

Keywords: Thalassemia, Calcium status; trace elements; patients; disease.

Introduction

Thalassemia is derived from the Greek word “Thalassa” meaning “the sea” because the condition was first described in populations living near the Mediterranean Sea (1). Thalassemia major And occurs when there is a mutation in both genes beta globulin, but the type of mutation in the legacy of beta more severe result in a severe shortage of the proportion of beta globulin and thus reducing Hb As a result of the breakage of abnormal red blood cells before the end of life (120) days. The patient needs periodic blood transfusion every 3-4 weeks to maintain a high percentage of Hb to grow healthy body (2). Of the age due to the breakage of early red blood cells appear symptoms of severe skin anemia, sometimes yellowing, “delayed growth, poor appetite, recurrence of inflammation (3-4) and with the persistence of anemia, other symptoms such as change in the shape of bones, especially” facial bones And the symptoms and face features become characteristic of this disease, as there is an enlargement of the spleen and liver and delay the child in the growth, but in simple cases in the case of carriers of the disease may occur a small blood to the extent that the disease is clear, “and live naturally and does not need treatment Thalassemia is one of the most common hereditary genetic diseases that break down red blood cells. Children with Thalassemia cannot produce enough hemoglobin because the bone marrow does not produce sufficient red blood cells for the need of their bodies. The red blood cells produced by them are almost free of hemoglobin. There are two types of thalassemia Alpha Thalassemia and Beta Thalassemia If the husband, wife, or both have Thalassemia, this affects the future of their children and the cause of Thalassemia, (5) it is a defect in the gene that is hemoglobin and the person has thalassemia. If he has a defect in one or more of the genes responsible for the manufacture of hemoglobin and acquired by the genetics of a parent, hemoglobin (6) is a red protein rich in iron is found in red blood cells. Hemoglobin is important because it enables red blood cells to transport oxygen from the lungs to all parts of the body. It is known that most blood cells, including red blood cells, are made regularly in the bone marrow. Red is found within the gaps in the large bones in the body. “(7) But because thalassemia disrupts the production of hemoglobin naturally, lead to a decrease in the level of doi: 10.5958/0976-5506.2019.00952.5
hemoglobin and an increase in the rate of breakage of red blood cells \(^8\), and this explains why it leads to anemia, and therefore does not have enough red blood cells to transport oxygen to all parts of the body, Which causes fatigue and tiredness. Most red blood cells, including red blood cells, are regularly made in the bone marrow, “a red spongy substance found within the gaps in the large bones in the body\(^9,10\), But because thalassemia disrupts the production of hemoglobin naturally, lead to a decrease in the level of hemoglobin and an increase in the rate of breakage of red blood cells, and this explains why it leads to anemia, and therefore does not have enough red blood cells to transport oxygen to all parts of the body, Which causes fatigue as well \(^11\)

**Materials and Method**

2-1 Important of the study.

To determine the levels of serum calcium and serum alkaline phosphatase in patients of thalassemia receiving a repeated blood transfusion to compare the levels of serum calcium and alkaline phosphatase in thalassemia patients with age and sex-matched controls.

2-2 Research samples

A special form was designed containing a number of questions. “A random sample of 50 patients with thalassemia was randomly selected to check for hereditary anemia in Masan for the period from January to the end of March 2018. Tests were performed on the patient to measure calcium concentration in thalassemia patients in the blood, and some enzymatic parameters.

2-3 the collection of blood samples

Blood samples were collected from patients diagnosed by thalassemia and hereditary anemia patients in Masan governorate and by (male and female) and age groups (1-14 )years Motion able sample (control group) were withdrawn from healthy people and model 30 Samples were obtained by withdrawing the venous blood volume (5 ml) from the patients by means of a special syringe for use (one syringe), placing the blood directly in the plastic test tube, a free anticoagulant material and then placing the tubes containing a blood centrifuge after installation of the plugs (3000  rpm / min) for a quarter of an hour to remove all existing blood cells and serum transferred to other specific tubes and stored in the refrigerator at 4 ° C - to perform the required analyzes.

2.4 Procedure:

Assay conditions:Wavelength …………… 570 nm (550 – 590)

Cuvette…………………………… 1 cm. light path

Temperature…… 37 C / 15 – 25 C

Adjust the instrument to zero with distilled water.

Pipette into cuvette (use clean disposable pipette tips for its dispensation)

<table>
<thead>
<tr>
<th></th>
<th>Blank</th>
<th>Standard</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1 ( ml )</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>R2 (ml)</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Standard</td>
<td>-</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>sample(µl)</td>
<td>-</td>
<td>---</td>
<td>20</td>
</tr>
</tbody>
</table>

Mix and incubate for 5 min, at room temperature(15 – 25 C) / 37 C

Read the absorption (A) of the samples and standard, against the blank,The color is stable for at least 40 minutes.

Note *

1- (CALCIUM CAL: Proceed carefully with this product because due to its nature it can be contaminated easily)

2- (Calibration with the aqueous standard may cause a systemic error in automatic procedures. in these cases, it is recommended to use serum calibration).

2 – 5 Method of measuring enzyme GOT

This enzyme was measured using a bioMerieux-France kit and the activity of this enzyme is measured by chromatic methods according to the following reaction equation

\[ \text{Aspartate} + \alpha \text{-Ketoglutarate} \rightarrow \text{Oxaloacetate} + \text{glutamate} \]

The resulting oxaloacetate is measured through chromatography through its interaction with a compound of 4.2 - dinitrophenylhydrazine to form the hydrazone derivative that this derivative is measured at a wavelength of 505nm.
Method of measuring enzyme GPT

The efficacy of this enzyme was measured using a bioMerieux-France kit and the measurement of GPT glutamic pyruvic transaminase was achieved through chromatic methods and through the following reaction:

Alanine + α-Ketoglutarate Pyruvate + Glutamate

Hydrazine - 2, 4 Dinitrophenyl hydrazine to form a derivative of Hydrazine. This compound is measured by optical spectroscopy with a wavelength of 505nm the absorption intensity will be proportional to the activity of this enzyme.

Method of measurement of alkaline phosphatase enzyme

A bioMerieux-France kit measures this enzyme. The basis of this method depended on the activity of this enzyme in the basal center According to the following equation:-

Phenylphosphate → Alkaline Phosphatase → Phenol + Phosphate

The liberated phenol is measured by the presence of the 4-amino-ante pyrene compound and Potassium ferricyanide, the presence of sodium arsenate is to stop the activity of the enzyme and then measured the solution along the wavelength of 510 nm. The amount of absorption is proportional to the amount of phenol released and this depends on the activity of the enzyme.

Statistical Analysis

The results were analyzed using the statistical Spss program in determining the standard deviation and the percentage as will to the other variables. The differences in case of probability p> 0.05 were considered significant differences.

Note: The title of the table should be before the table as opposed to the Figures to be title to the bottom

Results

Table 1: Levels of serum calcium, in patients with β-thalassemia major and controls.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Controls</th>
<th>Thalassemics</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium (mg/dl)</td>
<td>9.5 ± 0.6</td>
<td>8.9 ± 0.47</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Table (2) Relationship between age, sex and thalassemia type

<table>
<thead>
<tr>
<th>Age</th>
<th>1-4</th>
<th>5-9</th>
<th>10 – 14</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>male</td>
<td>female</td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td>Major</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Intermediate</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Small</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>8</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>%</td>
<td>44%</td>
<td>% 38</td>
<td>% 18</td>
<td>62%</td>
</tr>
</tbody>
</table>

Figure (1) Relationship between sex and thalassemia type.
Figure (2) Relationship between age and thalassemia type.

Table (3) shows both mother and father disease infection to parents

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mother</td>
<td>13</td>
<td>26%</td>
</tr>
<tr>
<td>Father</td>
<td>22</td>
<td>44%</td>
</tr>
<tr>
<td>both of them</td>
<td>15</td>
<td>30%</td>
</tr>
</tbody>
</table>

Figure (3) shows both mother and father disease infection to parents

Table (4) represents some of the biochemical parameters of the thalassemia patients and control value

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean ± SD</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALP U/L</td>
<td>Patient (165±17) Controls (81±22)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>GOT U/ml</td>
<td>Patient (12.6±7.5) Controls (34.6±3.44)</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>GPT U/ml</td>
<td>Patient (15.7±2.8) Controls (10.6±11)</td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

Discussion

The results of the study showed that the total calcium concentration in microg / 100 ml for blood samples of thalassemia patients (50 samples) and for three different age groups and for both sexes was (8.9 ± 0.47) μg / 100 ml was less than the total calcium level in the serum of the healthy group (30 samples), which ranged from (9.5 ± 0.6) μg / 100 ml. The mean differences were (p <0.05) among patients with thalassemia and healthy shown in the following table (1), Table (2) figure (1,2) shows the relationship between age, Sex and thalassemia type. The most common type of infection is Thalassemia and the
most common age group with this disease (1-9 years) the most common age group with all types of beta-thalassemia is (1-4) years. The percentage of males is 62% for males and 38% for females. This is identical to the study of (11): the results also show that the majority of the infected patients are Thalassemia type. This type needs to give the patient special drugs and give him periodic blood, which costs the family many financial burdens, in addition to the psychological problems suffered by the patient the results showed a higher level of male infection than females. This may not mean a genetic link to sex but may reflect the interest of male families more than females, in addition to the reluctance of families to review centers and hospitals when the disease appeared in females, but we cannot neglect the possibility of sex. Table (3) shows that the mother, father or both are infected the highest percentage was the father’s injury 44% and the proportion of the mother’s injury 26%, while the proportion of infected together “is 30% Hypocalcaemia occurring in β-thalassemia major is attributed to hyperparathyroidism mainly. Low parathyroid hormone levels lead to excessive calcium loss in urine, decreased bone remodeling and decreased intestinal absorption of calcium. Hypocalcemia can also occur with massive blood transfusions due to the complex of citrate with serum calcium.(12) The results showed a significant increase in the activity of alkaline phosphatase enzyme for patients (165 ± 17) The activity of the enzyme in the serum of the control ( 81±22 ) and therefore there was a significant difference p <0.05. The reason for this may be because most of the activity of this enzyme comes from bone tissue and since Thalassemia patients suffer from the dissolution of this tissue, this leads to the leakage of this enzyme to the circulatory system and then increase the effectiveness of this enzyme (13). the study of the enzyme Alkaline phosphatase (ALP) in patients with thalassemia, which is one of the genetic blood diseases, which is characterized by a reduction in the proportion of blood within the hemoglobin of red blood cells where the ALP enzyme in the liver and bone marrow and that the bulk of the enzyme base phosphate in the serum comes from these two tissues (Bone marrow and liver) and is secreted in the circulatory system, so the high activity of this enzyme is often due to the conditions of these two tissues or perhaps due to the effects of iron on liver cells as it may break the increase of iron concentrations . Liver cells leading to the transmission of this enzyme and in large quantities to the bloodstream and thus to increase the effectiveness of this enzyme compared with healthy individuals. For GOT, there were significant differences between patients (GOT) and healthy (P <0.05), (GPT) and P <0.05. Both enzymes are spread in many tissues of the human body (14) and that the enzyme GOT more effective than the enzyme GPT (15). The GOT enzyme is abundant in the tissue of the heart-liver and skeletal muscles as well as the kidney while the liver contains large amounts of GPT Other tissues such as kidney- heart skeletal muscles contain abundant amounts of this enzyme. The reasons for the low effectiveness of enzymes from the normal level of healthy may be due to the amounts of iron in the serum of patients, which precipitate in these members, resulting in the breakdown of fat of some cells of these members. It appears that oxidative stress is the main mechanism in the major disease shifts of patients with thalassemia (16). These results indicate a significant consumption of antioxidants under increased iron output of continuous blood transfusions or oxidative stress in thalassemia patients The main purpose of blood transfusion is to eliminate anemia, suppress the formation of ineffective blood cells and inhibit the increased absorption of iron by the gastrointestinal tract (17) (Thus, excess iron will be stored as in the case of hemosiderin and the liver and spleen. (18) That the accumulation of iron amounts is a toxic condition will lead to tissue damage Leading to the formation of ROS molecules such as superoxide ion (Ȯ2)(ȮH), monoxide and hydrogen peroxide that drive oxidation in the thalassemia.

Conclusion
Our conclusion about some changes in some of the biochemical parameters of Thalassemia patients can be attributed to liver and heart diseases as well as renal failure arising from the toxicity of high iron concentration, which is a characteristic of thalassemia.

Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding.

References
1. Shah S. Assessment of serum calcium and...


12- Al-Musawi and Osama Mohamed Hassan (recurrence of thalassemia alpha and beta in a sample of infected Iraqis and in relation to some of the clan standards. Institute of Genetic Engineering and Biotechnology / University of Baghdad / , 2004 Thesis; page 97-103


12. Samir M. Awadallah, Manar F Atoum , Nisreen A. Nimer and Suleiman A. saleh .Ischemia modified albumin : An oxidative stress marker in \( \beta \)-Thalassemia


Evaluation of Bone Metabolism Biomarkers in Hemodialysis Chronic Kidney Disease

Firas Faris Rija1, Zaid Mohmmed Mubarak Almahdawi1, Sura Zahim Hussein2

1Biology Department, College of Sciences, Tikrit University, Iraq, 2Clinical Biochemistry Unit, Salah Aldeen Directorate, Iraq

Abstract

Metabolic bone disease (MBD) is a common complication of chronic kidney disease (CKD) and is a part of a broad spectrum of disorders of mineral metabolism that occur in this clinical setting and result in both skeletal and extraskletal consequences. This study was a cross sectional which conducted in Dialysis Unit in Tikrit Teaching Hospital in Tikrit city. The study started from January 2018 to August 2018 on study population age ranged from (18 – 68) years old The total of 60 subjects were separated to two groups as following: Control: This group consist of 30 healthy individuals (15 females and 15 males), and Hemodialysis (HD) (CKD) patients: This group consist of CKD 30 patients (15 females and 15 males). The results referred to the increased levels of Transforming growth factor- β (TGF-β), Osteoprogestrin (OPG), Sclerostin (SOST), Osteocalcin (OC) and C-reactive protein (CRP) in CKD with HD with highly significant differences (P≤0.01) when compared with control group. The bone metabolism biomarkers are increased in HD CKD patients who complicated to MBD.

Keywords: Metabolic bone disease, chronic kidney disease, Hemodialysis, Transforming growth factor- β.

Introduction

Metabolic bone disease is a common complication of chronic kidney disease (CKD) and is part of a broad spectrum of disorders of mineral metabolism that occur in this clinical setting. Alterations in the control mechanisms for calcium and phosphorus homeostasis occur early in the course of CKD and progress as kidney function decreases (1).

Chronic kidney disease (CKD) refers to the progressive and irreversible decline in renal function and is defined as kidney damage for ≥3 months based on findings of abnormal structure or function or glomerular filtration rate (GFR) 60 > mL/min/1.73 m² for ≥3 months with or without evidence of kidney damage (2,3).

Osteocalcin is a small protein (49 amino acids) with a molecular weight 5.8 kDa synthesized by mature osteoblasts. Serum osteocalcin levels are high in patients with CKD. The increased serum accumulation of osteocalcin in patients with CKD can be related to decreased renal clearance, increased bone metabolism, or a combination of both (4).

Sclerostin (SOST) is a 190-residue with a molecular weight 22.5 kDa secreted glycoprotein (5). Serum SOST levels were significantly correlated with age and were higher in male than female patients with stage III b and IV CKD (6).

Osteoprotegerin (OPG) is expressed as a circulating glycoprotein of 401 amino acids with seven structural domains (7). PTH appears to stimulate RANKL and inhibit OPG secretion, affecting their serum levels in renal failure. In this way the RANKL/OPG cytokine system mediates the effects of PTH and other humoral factors on bone metabolism, thus reflecting their impact on bone composition in several types of renal osteodystrophy (8).

Transforming growth factor (TGF-β) is a Polypeptide initially synthesized as pre-pro-TGF-β, a monomer of a molecular weight of 55kDa and consisting of 390 amino acid residues (9). TGF-β plays a pivotal role in the progression of renal fibrosis, and therapeutic interventions targeting TGF-β have been successful and well tolerated in animal models (10).

C-reactive protein (CRP) is a 206-amino acid member of the short pentraxin family, alongside serum
amyloid P component (SAP). CRP is predominantly synthesized in the liver (11). Elderly Iranians with the metabolic syndrome and high CRP levels had significantly increased risk of CKD (12).

Materials and Method

The study was a cross sectional which conducted in Dialysis Unit in Tikrit Teaching Hospital in Tikrit city. The study started from January 2018 to August 2018 on study population age ranged from (18 – 68) years old. The total of 60 subjects was separated to two groups as following:

Group one:

Control group: This group consists of 30 healthy individuals (15 females and 15 males) with no personal and familial history of any diseases.

Group Two:

Hemodialysis (HD) (CKD) patients: This group consist of CKD 30 patients (15 females and 15 males) with hemodialysis treatment.

ELISA kits were used to evaluate serum TGF – β, Osteocalcin, SOST, OPG and CRP by sunlong company. The statistical analysis was carried out by using statistical program (SPS, 2001) and comparison between groups which were made by using one-way analysis of variance (ANOVA), and tried out the arithmetic means for parameters by using test of Duncan multiple ranges. The level of statistical significance was taken at (P<0.05).

Results

The mean ± SD of TGF-β levels for total, male and female of HD CKD patients (440.1±366.5, 320.6±338.7, 559.5±366.8 pg/ml) and control (118.7±40.9, 128.5±36.4, 108.9±44.1 pg/ml) respectively as shown in table (1) and figure (1), and the mean ± SD of OC levels for total, males and females of HD CKD patients (14.5±15.2, 11.1±9.88, 17.9±16.4) pg/ml and control (4.0±1.9, 3.9±1.8, 4.1±2.1 pg/ml) respectively as shown in table (1) and figure (2), while the mean ± SD of SOST levels for total, males and females of HD CKD patients (157.1±142.2, 95.9±89.77, 218.3±209.3 ng/ml) and control (22.6±5.0, 24.1±4.3, 21.0±5.3 ng/ml) respectively as shown in table (1) and figure (3), but the mean ± SD of OPG levels for total, male and female of HD CKD patients (585.5±380.1, 588.6±387.2, 582.5±387.4 pg/dl) and control (160.7±103.4, 202.8±96.5, 118.6±95.1 pg/dl) respectively as shown in table (1) and figure (4), and the mean ± SD of CRP levels for total, male and female of HD CKD patients (10.9±7.7, 12.2±8.8, 9.68±6.6 mg/l) and control (4.0±0.49, 3.9±0.53, 4.1±0.48 mg/l) respectively as shown in table (1) and figure (5).

Table 1: The mean ± SD of all parameters for HD CKD patients and control

<table>
<thead>
<tr>
<th>Parameters</th>
<th>HD CKD patients</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Males</td>
</tr>
<tr>
<td>TGF-β (pg/dl)</td>
<td>440.1±366.5</td>
<td>320.6±338.7</td>
</tr>
<tr>
<td>P value</td>
<td>P≤ 0.01</td>
<td>P≤ 0.01</td>
</tr>
<tr>
<td>OC (pg/ml)</td>
<td>14.5±15.2</td>
<td>11.1±9.88</td>
</tr>
<tr>
<td>P value</td>
<td>P≤ 0.01</td>
<td>P≤ 0.01</td>
</tr>
<tr>
<td>SOST (ng/ml)</td>
<td>157.1±142.2</td>
<td>95.9±89.77</td>
</tr>
<tr>
<td>P value</td>
<td>P≤ 0.01</td>
<td>P≤ 0.01</td>
</tr>
<tr>
<td>OPG (pg/dl)</td>
<td>585.5±380.1</td>
<td>588.6±387.2</td>
</tr>
<tr>
<td>P value</td>
<td>P≤ 0.01</td>
<td>P≤ 0.01</td>
</tr>
<tr>
<td>CRP (mg/dl)</td>
<td>10.9±7.7</td>
<td>12.2±8.8</td>
</tr>
<tr>
<td>P value</td>
<td>P≤ 0.01</td>
<td>P≤ 0.01</td>
</tr>
</tbody>
</table>
DISCUSSION

In the present study, TGF-β increased in HD CKD patients with highly significant differences (P≤0.01) except male with significant differences (P≤0.05) when compared with control group. Our findings of TGF-β at group HD CKD patients is agreed with some studies were performed by (13-16).

The most abundant form of TGF-β superfamily in mammals is TGF-β1. TGF-β has been recognized as a central player in many pathological events related to CKD progression, at the glomerular, tubulointerstitial and vascular levels, whereas TGF-β overexpression causes renal fibrosis (17).

TGF-β production is associated with CKD progression. Circulating TGF-β levels is a reliable biomarker of CKD (18).

In the present study, OPG increased in HD CKD patients with highly significant differences (P≤0.01) when compared with control group, and this result was agreed with (7, 19).

Elevated OPG levels have been interpreted as a failed compensatory mechanism trying to counteract the ongoing calcification process; however, because OPG production and expression are highly regulated by several inflammatory cytokines (20).

Mechanisms underlying OPG increase in CKD might include low-grade inflammation, FGF-23 elevation, and kidney function itself (21).

The level of SOST was increased with highly significant differences (P≤0.01) in HD CKD patients when compared with control group. These results agreed with (22, 23).

Sabbagh et al. suggests that an increase in osteocyte
production is most likely the primary event that leads to
the elevation in serum sclerostin levels observed in CKD
patients (24).

In our findings, OC increased in HD CKD patients,
and this increase was highly significant differences
(P≤0.01) when compared with control group. These
results of CKD agreed with (25, 26).

In patients with impaired renal function plasma
OC levels are markedly elevated due to increased
bone turnover and decreased renal elimination (27). The
imbalance in the process of endothelial damage and
repair, therefore, may contribute to VC via increasing
the number of OC-positive endothelial progenitor cells
(28).

In the present study, CRP levels increased with
highly significant differences (P≤0.01) in HD CKD
patients when compared with control group. The current
results of CRP agreed with (29-31).

Systemic inflammation occurs among patients
with chronic kidney disease (CKD). Along the drop in
glomerular filtration rate (GFR) below 60mL/min/1.73
m², the severity of inflammation increases with the
progression of renal failure (32).

CRP is also supportive in prognostication and in
monitoring treatment in CKD patients, it rose in these
patients because CKD is an inflammatory process and
pro-inflammatory cytokines are responsible for its
increased synthesis (33).

Conclusion

Our findings suggest that the TGF- β, OPG,
SOST, OC and CRP are plays an important role in the
bone turnover of hemodialysis CKD patients. Mineral
metabolism disturbance caused by renal dysfunction is
inherently complicated.

Ethical Clearance: The Research Ethical
Committee at scientific research by ethical approval of
both environmental and health and higher education and
scientific research ministries in Iraq

Conflict of Interest: The authors declare that they
have no conflict of interest.

Funding: Self-funding

References

1. Moe S, Drueke T, Cunningham J, Goodman W,
Martin K, Olgaard K, Ott S, Sprague S, Lameire
N, Eknayan G. Definition, evaluation, and
classification of renal osteodystrophy: a position
statement from Kidney Disease: Improving Global
Outcomes (KDIGO). Kidney international. 2006
Jun 1;69(11):1945-53.

2. Longmore M, Wilkinson IB, Davidson EH,
Medicine. 2010, Oxford University Press, Oxford,
UK, 8th edition.

3. Denker M, Boyle S, Anderson AH, Appel LJ, Chen
J, Fink JC, Flack J, Go AS, Horwitz E, Hsu CY,
Kusek JW. Chronic Renal Insufficiency Cohort
Study (CRIC): overview and summary of selected
findings. Clinical Journal of the American Society

4. Razzaque MS. Osteocalcin: a pivotal mediator
or an innocent bystander in energy metabolism?.
Nephrology Dialysis Transplantation. 2010 Dec
3;26(1):42-5.

5. Veverka V, Henry AJ, Slocombe PM, Ventom A,
Mulloy B, Muskett FW, Muzylak M, Greenslade
K, Moore A, Zhang L, Gong J. Characterization of
the structural features and interactions of sclerostin
molecular INSIGHT into a key regulator of Wnt-
mediated bone formation. Journal of Biological
Chemistry. 2009 Apr 17;284(16):10890-900.

6. Thambiah S, Roplekar R, Manghat P, Fogelman I,
Fraser WD, Goldsmith D, Hampson G. Circulating
sclerostin and Dickkopf-1 (DKK1) in predialysis
chronic kidney disease (CKD): relationship with
bone density and arterial stiffness. Calcified tissue

E, Carretta R, Barbone F, Fabris B. Circulating
osteoprotegerin is associated with chronic kidney
disease in hypertensive patients. BMC nephrology.

8. Doumouchtsis KK, Kostakis AI, Doumouchtsis SK,
Tziamalis MP, Stathakis CP, Diamanti-Kandarakis
E, Dimitroulis D, Perrea DN. Associations
between osteoprotegerin and femoral neck BMD in
hemodialysis patients. Journal of bone and mineral


Estimation of TLR-4 and Cytokines Levels (Interleukin-1 Beta, Interleukin-8, and Tumor Necrosis Factor) in Serum and Peritoneal Fluid of Endometriosis Women

Jinan Abdul-abbas Shamkhi, Ahmed Abdul-hassan Abbas, Thuraya Hussam Al-Deen

Al-Kut Hospital for Pediatrics and Obstetrics, Baghdad, Iraq, College of Medicine, Al-Nahrain University, Baghdad, Iraq, Gynecology Department of Al-Emamain Al-Kademian Medical City, Baghdad, Iraq

Abstract

Many women have a delay in diagnosis of endometriosis; an important factor that contributes to the diagnostic delay is the lack of noninvasive methods for detecting the disease. The aim of this study was to evaluate the levels of IL-1β, IL-8, TNF-α, and TLR-4 in serum and peritoneal fluid (PF) of women with endometriosis. The case group comprised of 30 women with endometriosis who newly diagnosed (admitted to the Gynecology Department of Al-Emamain Al-Kademian Medical City, Al-Zahraa teaching hospital and Al-kut hospital of pediatric and obstetric) and 30 control group during the period from November 2016 to November 2017. The four biomarkers were measured by using ELISA. Endometriosis patients had significantly higher serum and PF concentrations of the four biomarkers compared to controls. These results may indicate the potential role of these biomarkers in non-invasive diagnosis of endometriosis.

Key words:- Endometriosis, Interleukin-1 beta, Tumor necrosis factor, TLR-4

Introduction

Endometriosis is an inflammatory disease characterized by the existence of endometrial glands and stroma outside the uterine cavity with significant reduction in quality of life among reproductive-age females (1). Menstrual tissue and endometrium that is refluxed into the peritoneal cavity is usually cleared by immune cell such as macrophages, natural killer (NK) cell, and lymphocytes. For this reason, immune system dysfunction is one likely mechanism for the genesis of endometriosis in the presence of retrograde menstruation (2).

The production of pro-inflammatory cytokines and growth of endometriosis in the pelvic environment can be regulated by the innate immune system (3). Peritoneal fluid contains higher concentration of proinflammatory and angiogenic cytokines presumably produced from immune cells such as macrophage and from the lesion itself, which contribute to the pathogenesis of endometriosis (4). Immune cells use cytokines to coordinate the host response to infection or trauma via autocrine and paracrine signaling. Based on their immune-regulatory role, cytokines are broadly classified as either pro-or anti-inflammatory. Proinflammatory cytokines such as interleukin-1 (IL-1), tumor necrosis factor alpha (TNF-α), interferon gamma (IFN-γ), IL8 and granulocyte-macrophage colony-stimulating factor (GM-CSF) primarily initiate and amplify the inflammatory response to infection or trauma by signaling the recruit of additional immune cells and pro-inflammatory mediators to the site of injury (5). The secreted TNF-α IL-1 IL-1β and IL8 may play an important role in the local and the systemic manifestations of the disease. Because of its importance in other inflammatory processes, it is likely that these cytokines plays a central role in the pathogenesis of endometriosis (6-8).

Toll-like receptor-4, is an essential receptor for bacterial endotoxin or LPS recognition which derived from the outer membrane of Gram-negative bacteria (9).

Corresponding author
Ahmed Abdul-hassan Abbas
E-mail: ahmed26770@yahoo.com
A reliable single biomarker or panel of biomarkers may help to diagnose endometriosis earlier and reduce unnecessary operation (10). Simple blood tests for prediction and diagnosis of endometriosis have a major impact on women's health (11), because many women have a delay in diagnosis of endometriosis, an important factor that contributes to the diagnostic delay is the lack of noninvasive methods for detecting the disease.

Materials and method

Thirty newly diagnosed endometriotic patients, admitted to the Gynecology Department of Al-Emamain Al-Kademian Medical City, Al-zahraa teaching hospital and Al-kut hospital of pediatric and obstetric were enrolled in this control study during the period from November 2016 to November 2017, their ages range between (18-45) years. Thirty apparently healthy women were selected as control group in the current study their age matched to the study group. The controls were fertile, not pregnant and non-smoker with no current infection (genital or systemic).

A total of 5 ml of venous blood were collected before the operation in gel tubes and about 3 ml of peritoneal fluid were obtained by gynecologist in plain tubes. Peritoneal fluid had been centrifuged at 300 \( \times \) g for 20 min, after which the supernatants removed to new tubes and stored in aliquots at -70°C.

Statistical Analysis

Data were organized in Microsoft office Excel software, 2010. The statistical package for social sciences (SPSS) software (version. 20) was used for all statistical analysis. Data were subjected to normality test (Shapiro-Wilk test) before statistically analyzed. Continuous variables were expressed as mean ± standard deviation (SD) or median and analyzed either by independent t-test for comparison between two groups or analysis of variance (ANOVA) for comparison among more than two groups. Binomial variables were expressed as frequency and percentage and analyzed by Pearson chi-square. A P-value of \( \leq 0.05 \) was considered a statistically significant.

Results

Demographical picture and clinical presentation

The results of this research were based on the analysis of 30 patients with endometriosis, compared with 30 apparently healthy women as controls. The present study showed that 83.33% of endometriosis patients were infertile [primary infertile 12 (40%) and secondary infertile 13(43.33%)]. Table (1) shows the variables between the two groups which including age, phases of menstrual cycle (secretory and proliferative), family history with disease, the fecundity, stages of disease, and symptoms like as abdominopelvic pain and dysmenorrhea.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Patients (30)</th>
<th>Controls (30)</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years) (mean ±SD)</td>
<td>31.86±8.52</td>
<td>32.43±7.08</td>
<td>0.780</td>
</tr>
<tr>
<td>Phases of menstrual cycle</td>
<td></td>
<td></td>
<td>0.067</td>
</tr>
<tr>
<td>Secretory</td>
<td>21 (70%)</td>
<td>13 (43.33%)</td>
<td></td>
</tr>
<tr>
<td>Proliferative</td>
<td>9 (30%)</td>
<td>17 (56.67%)</td>
<td></td>
</tr>
<tr>
<td>Family history</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>26 (86.67%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>4 (13.33%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stages of disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimal stage I</td>
<td>17 (56.67%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild stage II</td>
<td>9 (30%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate stage III</td>
<td>3 (10%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe stage IV</td>
<td>1 (3.33%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cont.. Table 1: Demographical picture and clinical presentation for patients and control groups.

<table>
<thead>
<tr>
<th>Pain/Sign</th>
<th>Patients (N, %)</th>
<th>Controls (N, %)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominopelvic pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>28 (93.33%)</td>
<td>5 (16.67%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Negative</td>
<td>2 (6.67%)</td>
<td>25 (83.33%)</td>
<td></td>
</tr>
<tr>
<td>Dysmenorrhea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>23 (76.67%)</td>
<td>2 (6.67%)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Negative</td>
<td>7 (23.33%)</td>
<td>28 (93.33%)</td>
<td></td>
</tr>
</tbody>
</table>

Results of IL-1β, IL-8, TNF-α and TLR-4 levels

The current study revealed significantly elevation in serum levels of IL-1β, IL-8, TNF-α, and TLR-4 in patients group in comparison with healthy control as shown in table (2).

Table 2: Serum levels of IL-1β, IL-8, TNF-α, and TLR-4 in endometriosis patients and control group.

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>Patients (Median)</th>
<th>Controls (Median)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1β (pg/ml) (Cloud-Clone Corp/USA)</td>
<td>24.691</td>
<td>4.388</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>IL-8 (pg/ml) (Cloud-Clone Corp/USA)</td>
<td>6.188</td>
<td>2.869</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>TNF-α (pg/ml) (Cloud-Clone Corp/USA)</td>
<td>59.79</td>
<td>8.304</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>TLR-4 (pg/ml) (RayBiotech/USA)</td>
<td>0.327</td>
<td>0.141</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

In addition, there was a significant elevation in peritoneal biomarkers in comparison with serum for the endometriosis patients as shown in table (3).

Table 3: Serum and peritoneal levels of IL-1β, IL-8, TNF-α, and TLR-4 in endometriosis patients.

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>Serum (Median)</th>
<th>Peritoneal fluid (Median)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1β (pg/ml)</td>
<td>24.691</td>
<td>51.137</td>
<td>0.002</td>
</tr>
<tr>
<td>IL-8 (pg/ml)</td>
<td>6.188</td>
<td>15.63</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>TNF-α (pg/ml)</td>
<td>59.79</td>
<td>117.52</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>TLR-4 (pg/ml)</td>
<td>0.327</td>
<td>0.701</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

According to the serum and peritoneal levels of the 4 biomarkers in different stages of disease, there was no statistically difference among the four stages with exception for IL-8 which showed significant difference among different stages in serum and peritoneal fluid with a P-value 0.05, 0.022 as shown in tables (4) and (5).
Table 4: Serum levels of IL-1β, IL-8, TNF-α, and TLR-4 in different stages of endometriosis.

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>Stage I No. (17)</th>
<th>Stage II No. (9)</th>
<th>Stage III &amp; IV No. (4)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1β (pg/ml)</td>
<td>28.15±17.24^a</td>
<td>24.09±15.69^a</td>
<td>33.01±22.28^a</td>
<td>0.686</td>
</tr>
<tr>
<td>IL-8 (pg/ml)</td>
<td>7.92±5.356^a</td>
<td>6.52±2.986^b</td>
<td>1.55±1.013^b</td>
<td>0.05</td>
</tr>
<tr>
<td>TNF-α (pg/ml)</td>
<td>60.32±15.358^a</td>
<td>61.50±30.62^a</td>
<td>67.45±38.128^a</td>
<td>0.868</td>
</tr>
<tr>
<td>TLR-4 (pg/ml)</td>
<td>0.30±0.193^a</td>
<td>0.83±0.858^b</td>
<td>0.54±0.578^ab</td>
<td>0.068</td>
</tr>
</tbody>
</table>

*Different small letters indicate significant differences.

Table 5: Peritoneal levels of IL-1β, IL-8, TNF-α, and TLR-4 in different stages of endometriosis.

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>Stage I No. (17)</th>
<th>Stage II No. (9)</th>
<th>Stage III and IV No. (4)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1β (pg/ml)</td>
<td>89.49±82.4^a</td>
<td>100.15±75.202^a</td>
<td>52.1±36.389^a</td>
<td>0.579</td>
</tr>
<tr>
<td>IL-8 (pg/ml)</td>
<td>15.91±5.5^a</td>
<td>32.99±27.909^b</td>
<td>10.08±3.631^a</td>
<td>0.022</td>
</tr>
<tr>
<td>TNF-α (pg/ml)</td>
<td>136.37±92.78^a</td>
<td>130.79±45.658^a</td>
<td>152.24±74.525^a</td>
<td>0.904</td>
</tr>
<tr>
<td>TLR-4 (pg/ml)</td>
<td>0.57±0.255^a</td>
<td>1.80±2.037^b</td>
<td>1.03±1.282^ab</td>
<td>0.058</td>
</tr>
</tbody>
</table>

*Different small letters indicate significant differences.

As well as, there was no statistically difference among different phases of menstrual cycle (secretory and proliferative) in patients concerning the serum and peritoneal levels of the 4 biomarkers as shown in table (6).

Table 6: Serum levels of the 4 biomarkers in different phases of menstrual cycle.

<table>
<thead>
<tr>
<th>Biomarkers</th>
<th>Secretory phase No. (21)</th>
<th>Proliferative phase No. (9)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-1β (pg/ml)</td>
<td>28.41±17.618</td>
<td>25.65±16.552</td>
<td>0.692</td>
</tr>
<tr>
<td>IL-8 (pg/ml)</td>
<td>6.36±4.034</td>
<td>7.32±6.46</td>
<td>0.626</td>
</tr>
<tr>
<td>TNF-α (pg/ml)</td>
<td>64.6±24.75</td>
<td>54.6±19.136</td>
<td>0.293</td>
</tr>
<tr>
<td>TLR-4 (pg/ml)</td>
<td>0.47±0.373</td>
<td>0.55±0.89</td>
<td>0.726</td>
</tr>
</tbody>
</table>

Discussion

Endometriosis is classified into four stages (I-minimal, II-mild, III-moderate, and IV-severe), the present study found that the stage 1 was found in 17 (56.67%) patients, stage 2 in 9 (30%), stage 3 was found in 3 (10%), while the rest 1 (3.33%), appeared in stage 4. The higher occurrence stages in this study were the minimal and mild (86.67%). AL-Tai et al. (2013) and Ali AM (2016) mentioned that the most stages were the mild and moderate (12,13) while by Daraj HA.(2017) the most stages were moderate and severe stages (14) also with Saber H, et al.(2013) the most stage was the moderate one (15).

These discrepancies in results of different studies with the present study could be related to that most of patients in the present study were recently diagnosed and discovered incidentally or may be to the small size of samples. Delayed diagnosis and treatment have significant consequences, as endometriosis is more advanced in women whose diagnostic laparoscopy is delayed, supporting progression of disease over time (16).

The pain is the highest priority research questions, beginning from mild, moderate to severe pain. In this study, the majority of women with endometriosis had been suffered from chronic pelvic or abdominal pain and this agree with other studies like AL-Tai TH. et
Multiple mechanisms underlie endometriosis-associated pain including nociception, inflammation, and alterations in peripheral and central nervous system pain processing. As also occurring in other chronic conditions, pain in endometriosis is often associated with psychological distress and fatigue, both of which may amplify pain (17).

The second most important chief complaint found by this study was infertility. The present study showed that 83.33% [primary infertile 12 (40%) and secondary infertile 13(43.33%)] of endometriosis patients were infertile, it was agree with study by Daraj HA.(2017) who found that secondary infertility in patients group constitute the largest portion (14). The causes of infertility in women with endometriosis may range from anatomical distortions due to adhesions and fibrosis to endocrine abnormalities and immunological disturbances (18).

Endometriosis likely has a genetic basis and a number of studies have demonstrated an increased risk for developing this disease in first-degree relatives of patients. According to the family history, the current work showed that 4 (13.33%) of patients had positive family history of endometriosis, while 26 (86.67%) showed negative family history, and this percentage is higher than the results obtained by Nouri et al. (2010) and Ali A.M.(2016) (19, 13), who found that 5.9% and 6% respectively had positive family history. Specific genes are differentially expressed in eutopic endometrium of endometriosis patients as compared to those from normal woman controls (20). The results suggest that gene dysregulation may play a role in the pathogenesis of endometriosis. A previous study conducted on twins revealed that the incidence of this disease in monzygotic twins was twice as much as that in dizygotic twins (21).

In the current study there was a statistically significant higher level of IL-1β, IL-8, TNF-α, and TLR-4 in serum of patients as compared to healthy controls. This findings in agreement with local study by Ali, AM.(2016) who showed that mean serum level of TNF-α was elevated in endometriotic patients as compared with healthy group (13), also agree with Egyptian study by Foda AA and Abdelaal IA. (2011) who indicated that serum TNF-α was significantly higher in women with endometriosis when compared with controls (22). Malutan AM et al. (2015) found that women with endometriosis had been significant higher level of IL-1β, IL-6, and TNF-α, compared to healthy controls (11).

Tumor necrosis factor-α may play a central role in the local and systematic manifestations of endometriosis, on the basis of evidence showing that it promotes the growth of endometriotic cells (23). On the other hand, blocking TNF-α appears to inhibit the development of the disease in animal models (24).

In the present study, there was no statistically significant difference in serum and peritoneal fluid level of IL-1β, IL-8, and TNF-α in women with endometriosis among different phases of menstrual cycle (proliferative and secretory), also this study is agree with previous studies by Bedaiwy, MA. et al. (2002) and Othman EE, et al. (2008) which demonstrated that there was none of the measured cytokines showed significant correlation with the cycle phase (25, 26). The finding that these measures were not affected by the phase of the menstrual cycles makes them more convenient to apply as reliable diagnostic tests in clinical practice.

Ethical Clearance: Ethical approval and informed consent were obtained from each participant in this study according to the declaration of Helsinki -ethical agreement, it was obtained from the Institutional Review Board of College of Medicine /AL- Nahrain University.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References

1- Guidice LC, Milad M, Mosbrucker C. Diagnosis and management of endometriosis: pathophysiology to practice. APGO Educational Series on Women Health Issues. 2015.


5- Cameron M J and Kelvin D J. “Cytokines and chemokines- their receptors and their genes: an overview,” Advances in Experimental Medicine and Biology, 2003; vol.520: 8–32

6- Braun DP, Ding J, Dmowski WP. Peritoneal fluid mediated enhancement of eutopic and ectopic endometrial cell proliferation is dependent on tumor necrosis factor- alpha in women with endometriosis. Fertility and Sterility. 2002; vol.78:727-32


Application of a Rapid Method for Gram Differentiation of Human Pathogenic and Non-Pathogenic Bacteria without Staining (Short Communication)

Ruua A. Talib1, Abid Ali Abeid Abiess1
1Dept. of Pathological Analysis, College of Al-Mustaqbale University, Iraq

SUMMARY

The Gram-stain reactions of pathogenic and non-pathogenic bacteria isolated from clinical samples were accurately characterized by mixing a concentrated droplet of cells with 3% potassium hydroxide (KOH). Compared to standard Gram-staining procedures, the KOH test was rapid, simple, and completely accurate. Forty-one isolates representing Bacillus, Corynebacterium, Escherichia, Haemophilus, Klebsiella, Neisseria, proteus, Pseudomonas, Salmonella, Shigella, Staphylococcus, and Streptococcus species were tested. Bacteria cell were removed from an agar medium with toothpick placed on a glass slide with drop of 3% KOH with rapid circular agitation. With Gram-negative stains the suspension become viscous as revealed by a mucoid thread that formed when the toothpick was lifted. Gram-positive bacteria dispersed in to the drop and did not have this reaction. One isolate of Corynebacterium caused an increase in drop viscosity, but did not produce a mucoid thread.

This method substitutes stains uses which are expensive and can be done in seconds.

Keywords: Gram stain, KOH test

Introduction

Determination of positive or negative Gram-stain reaction is essential in the identification and classification of human pathogenic bacteria. One problem often encountered when using Gram-staining techniques is that some Gram-positive bacteria will have dark decolorize readily and some Gram-negative bacteria will have dark staining bodies depending on the culture medium and the stage of colony growth (1). Pseudomonas aeruginosa is the second most common bacteria cause of nosocomial infections (2). It is characterized by ability to adapt to diverse environments with low nutrient concentration and over a large temperature range between 4 and 42°C (3). Gregersen (1978) used a method for distinction of Gram-negative from Gram-positive bacteria including Pseudomonas aeruginosa, P. fluorescense, Streptococcus spp. and Bacillus spp. often associated with plants (4). Successful application of KOH test proved to differentiate clinical anaerobic bacteria (5). This paper showed the rapid method for Gram differentiation of human pathogenic and non-pathogenic bacteria by using KOH test.

Materials and Method

Human pathogenic and non-pathogenic bacteria used in these tests were obtained from culture collection of laboratory of Al-Sader Hospital in Al-Najaf (SHN) and from department of pathological analysis techniques of AL-Mustaqbal University college (PAT).

All bacteria were grow at 37°C for 24-48 hr. (depending on growth rate) on different selective medium for staining and KOH characterization.

Staining and KOH tests: Gram staining procedure utilizing ammonium oxalate, crystle violet, Iodine solution, 95% ethyl alcohol as the decolorizing agent and Safranin O as the counter stain were followed as described (6). Two drops of hydroxide were placed on a clean glass slide, culture media with a flat wooden toothpick and placed in to the drop of KOH with rapid, circular agitation. After 5-8sec. the toothpick was alternately raised and lowered just off the slide surface to detect astringing effect. The KOH test considered positive if drop viscosity increased and stringing
occurred within 15 sec.

**Results and Discussion**

The results showed that Gram-negative bacteria always caused an increase in KOH viscosity and formed a mucoid thread when lifted from the slide. Gram-positive bacteria had no reaction in KOH and generally dispersed into the drop (table 1).

The use of KOH test as an effective supplement to Gram staining has been very useful for the rapid and accurate differentiation of a large number of bacteria originally isolated from clinical samples. This method utilizes the rapid disruption of the cell wall of Gram-negative bacteria in alkaline solution releasing deoxyribonucleic acid, which causes the viscous threading. Gram-positive bacteria do not lyse in 3% KOH. However, one isolate of *corynebacterium* gave a slight increase in viscosity after 20 sec. but did not form mucoid thread. This study supports other findings that plant pathogenic and saprophytic bacteria can use this method for Gram differentiation without staining.

**Table 1: Comparison of Gram staining and KOH test for differentiation of isolates of bacteria obtained from SHN and PAT.**

<table>
<thead>
<tr>
<th>Genus or Species</th>
<th>Number of isolation</th>
<th>Gram stain reaction</th>
<th>KOH reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Bacillus cereus</em></td>
<td>1</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>B. subtilis</em></td>
<td>1</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>B. coagulans</em></td>
<td>1</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Corynebacterium diphtheria</em></td>
<td>2</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>C. xerosis</em></td>
<td>2</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>H. ducreyi</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Klebsiella pneumonia</em></td>
<td>2</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>K. ozaenae</em></td>
<td>2</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Neisseria gonorrhoeae</em></td>
<td>3</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>N. meningitides</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Proteus mirabilis</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>P. morgana</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>P. rettgeri</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>P. vulgaris</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>2</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Salmonella typhi</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Shigella sonnei</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Sh. dysenteriae</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Sh. flexneri</em></td>
<td>1</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td><em>Sh. bodydil</em></td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>2</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Staph. albus</em></td>
<td>2</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Streptococcus pyogenes</em></td>
<td>3</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Strep. Viridans</em></td>
<td>2</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

**Conclusion**

All gram positive and gram negative results obtained by gram staining were confirmed by KOH method.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.
Funding: Self-funding

References

Accuracy of Ultrasound in Diagnosis of Carpal Tunnel Syndrome in Correlation with Operative Findings

Laith F. Farman Al hialy
College of Medicine, University of Baghdad, Iraq

Abstract

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy; it is responsible for significant morbidity and occupational absence. Clinical assessment is used for initial diagnosis and Nerve Conductive studies are currently the principal test used to confirm the diagnosis; Ultrasound (US) can be used as an alternative to NC studies to diagnose CTS. US can assess the anatomy of the median nerve & it’s the only way to detect adhesion during dynamic examination and also identify pathology of the surrounding structures that may compress the nerve. The aim of current study was to identify the accuracy of US in the diagnosis of CTS in correlation with the operative findings.

A prospective study included 65 patients with CTS, all of them examined with superficial ultrasound pre operatively were US findings collected, 52 patient of them operated surgically and operative finding recorded, in this study we considered the operative findings as gold stander for correlation its findings with our ultrasound findings, no similar researches was found, but many researches correlate and compare the ultrasound findings with clinical symptoms, neural conductive study or MRI findings.

Enlargement of the median nerve as it enters the carpal tunnel was frequently detected (41) times among the whole sample patients (65) and from the (52) operated patient (28) times recorded, the ultrasound examination was 87% accuracy with 88% Sensitivity, 85% Specificity with PV= 0.001.

Ultrasound examination is very significant and sensitive in diagnosis of (CTS) could be used confidently in symptomatic patient as fist line examination approach, and it is the only modality that can assess the fixation of median nerve in the carpal tunnel through dynamic technique.

Keywords: carpal tunnel syndrome, ultrasound examination, operative findings

Introduction

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy; it is responsible for significant morbidity and occupational absence. Clinical assessment is used for initial diagnosis and Nerve Conductive studies are currently the principal test used to confirm the diagnosis; the carpal tunnel is fibro-osseous space between the carpal bones and the flexor retinaculum, or called transverse carpal ligament which extended from scaphoid to pisiform and from hamate to trapezium. It contains the eight flexor digitorum tendons, superficialis and profundus, the flexor pollicus longus and median nerve, the etiology of (CTS ) or encroachment of the median nerve result from decrease in size of tunnel, or increase in the volume of tunnel content , the most recently described common cause of CTS is repetitive stress injury as in computer keyboard operators. US examination of the median nerve in the carpal tunnel is relatively quick test that is extremely acceptable to the patient and can be performed in the outpatient clinic at initial assessment.

Patient forearm should rest comfortably and the wrist is in supination, in the longitudinal imaging plane the median never is demonstrated crossing parallel and superficial to the flexor digitorum tendons

Corresponding author:
Laith F. Farman Al hialy
E-mail: drlaithfadhel@gmail.com
The tunnel contains the flexor digitorum tendons which are hyper echoic, the median nerve has a characteristic appearance which differentiates it from the fibillar hyper echoic tendons, the nerve has hypo echoic with a hyper echoic borders, rounded or oval in the proximal wrist and flattens progressively as it courses through the carpal tunnel, within the tunnel the nerve is in intimate contact with the flexor retinaculum, its size remains constant but its shape is quite variable, by dynamic examination, moving the fingers we differentiate the nerve from tendons.

Flattening of the nerve, especially at the level of the hamate bone, volar bulging of the flexor retinaculum, enlargement of the median nerve as it enters the carpal tunnel, fluid or fat-fibrous layer surrounding the tendons, decreased mobility of the median nerve on flexion and extension of the fingers.

The mean cross sectional area of the median nerve is greater than 10 mm squared at the pisiform bone level, the flattening ratio of the nerve (transverse diameter divided by AP diameter) is greater than 1:1 at the level of the hamate bone.

Surgical treatment of CTS involves division of the flexor retinaculum, either in an open procedure or endoscopically during the operation many findings be observe as: Compression of the median nerve under the ligament, pseudoneuroma (nerve swelling) proximal to the compression, adherent tenosynovitis under surface of flexure retinaculum, fibrous lesion surrounding the nerve or Median nerve scaring.

This study aim to identify the accuracy of US examination in the diagnosis of CTS in correlation with the operative findings

**Materials and Method**

A prospective study was conducted at Specialist surgery teaching hospital and Baghdad teaching hospital in Baghdad medical city, during the period from 20th of December 2014 to the 30th of September 2015.

A total of 65 patients agreed to participate in this study, they referred from the neurosurgery department, orthopaedic department, nerve conductive clinic and outpatient clinic, 58 of them were females and 7 males, 52 of them were operated on, 13 not operated, all of them improved and documented by NCS to have CTS.

All patients were examined, through superficial ultrasound examination approach by using Philips HD 11XE® ultrasound system with linear probe of 7.5 MHz frequency. all of them examined with superficial ultrasound pre operatively were US findings collected, 52 patient of them operated surgically and operative finding recorded, in this study we considered the operative findings as gold standard for correlation its findings with our ultrasound findings, no similar researches was found, but many researches correlate and compare the ultrasound findings with clinical symptoms, neural conductive study or MRI findings, examination done with 2 direction, longitudinal and transverse, and dynamic examination, subjective and objective ultrasound findings elected.

We used the upper normal CS area limit for the median nerve before entering the Carpal tunnel, at the pisiform bone level as (<10 mm²), the transverse to AP diameter ratio of median nerve in cross section image greater than (4:1) to be acceptable as flattening of median nerve, volar bulging of flexor retinaculum is greater than (3.1 nm).

These measurements were proved and published in the diagnostic ultrasound guide of CTS.

In the transverse view we calculated the Cross section area of median nerve in the entrance of tunnel at level of pisiform bone in millimetre square (mm²). Also in the transverse view we measure the AP & transverse diameter of median nerve and the ratio of flattening. Lastly we calculated the flexor retinaculum bulging in (mm) then we transfer the data to computer to find the correlation and results.

**Statistical Analysis:**

Statistical analysis was performed by using the statistical package for social sciences (SPSS) version 17, and the appropriate statistical tests were applied accordingly. X-square was used to test the relation between ultrasound and operative tests. P – Value of less than 0.05 was considered significant.

**Results**

**Age & gender distribution**

The mean age of the patients was 45.9 ± 13 years (range from 19 to 74 years).
The female to male Ratio (9:1) with proximal percentage of 89.2% Female to 10.8% Male.

The results are listed in Tables below:

**Table 1: US subjective findings**

<table>
<thead>
<tr>
<th>Ultrasound findings</th>
<th>Yes</th>
<th>No</th>
<th>Yes Percent</th>
<th>No Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flattening of the nerve</td>
<td>44</td>
<td>21</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>Volar bulging of the flexor retinaculum</td>
<td>43</td>
<td>22</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td>Enlargement of the median nerve</td>
<td>41</td>
<td>24</td>
<td>63%</td>
<td>37%</td>
</tr>
<tr>
<td>Large fluid or fat-fibrous layer surrounding the tendons</td>
<td>5</td>
<td>60</td>
<td>8%</td>
<td>92%</td>
</tr>
<tr>
<td>Decreased mobility of the median nerve</td>
<td>10</td>
<td>55</td>
<td>15%</td>
<td>85%</td>
</tr>
</tbody>
</table>

**Table 2: Operative findings**

<table>
<thead>
<tr>
<th>Operative findings</th>
<th>Yes</th>
<th>No</th>
<th>Yes Percent</th>
<th>No Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression of the median nerve</td>
<td>50</td>
<td>2</td>
<td>96%</td>
<td>4%</td>
</tr>
<tr>
<td>Pseudoneuroma (median nerve swelling)</td>
<td>32</td>
<td>20</td>
<td>62%</td>
<td>38%</td>
</tr>
<tr>
<td>Adherent tenosynovitis under surface of flexure retinaculum</td>
<td>24</td>
<td>28</td>
<td>46%</td>
<td>54%</td>
</tr>
<tr>
<td>Median nerve scaring</td>
<td>28</td>
<td>24</td>
<td>54%</td>
<td>46%</td>
</tr>
<tr>
<td>Fibrous lesion surrounding the nerve</td>
<td>3</td>
<td>49</td>
<td>6%</td>
<td>94%</td>
</tr>
</tbody>
</table>

**US objective findings**

The mean result of cross sectional area of the median nerve (significantly must be greater than 10 mm squared at the pisiform bone level) was (13.5) mm² ± 3.3 mm² proximately, ranging from (5 mm²) to (24 mm²). The mean result of flattening ratio of the nerve (transverse diameter divided by AP diameter) significantly must be greater than 4:1 at the level of the hamate bone were (3.7:1) ±0.4 proximately, ranging from (2.5:1) to (4.4:1).

The mean result of Volar bulging of the flexor retinaculum (significantly must be greater than 3.1mm) was (2.8mm± 0.4mm) proximately, ranging from (1.6mm) to (3.8mm).

**Table 3: CS area, flattening ratio and FR bulge**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS area mm²</td>
<td>65</td>
<td>5.00</td>
<td>24.00</td>
<td>13.5</td>
<td>3.3</td>
</tr>
<tr>
<td>Flattening ratio</td>
<td>65</td>
<td>2.50</td>
<td>4.40</td>
<td>3.7</td>
<td>0.44</td>
</tr>
<tr>
<td>FR bulge mm</td>
<td>65</td>
<td>1.60</td>
<td>3.80</td>
<td>2.8</td>
<td>0.44</td>
</tr>
</tbody>
</table>

**Table 4: Correlation of US & operative findings**

<table>
<thead>
<tr>
<th>Correlation findings</th>
<th>Accuracy</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enlargement of median nerve in ultrasound and operation</td>
<td>87%</td>
<td>88%</td>
<td>85%</td>
<td>0.001</td>
</tr>
<tr>
<td>Flattening of median nerve in Ultrasound and operation</td>
<td>76%</td>
<td>76%</td>
<td>100%</td>
<td>0.017</td>
</tr>
<tr>
<td>Decrease mobility, fixation of median never in ultrasound and operation</td>
<td>71%</td>
<td>38%</td>
<td>100%</td>
<td>0.005</td>
</tr>
</tbody>
</table>

**Discussion**

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy, currently many modalities were applied to for diagnosis like US and MRI.
US is now well established as a diagnostic tool in CTS, and can be used as an alternative to NCS for diagnosis of CTS, there are many advantages for US, including that it is readily available, non-invasive, lower cost, higher patient acceptability has a shorter examination time and can be used to assess a number of parameters of the median nerve such as size, morphology, mobility (using dynamic examination in addition, US provide information about anatomical variations of the median nerve and surrounding structures that may be a causative factor in CTS).

The current study included 65 patients ranging between (19 – 74 years old) with mean age being (45.9 years).

From the total 65 patients of both genders, in our study the female were predominant, 58 female, 7 male with ratio 9:1 female to male.

This study assesses the accuracy of US in diagnosis of CTS by specific detective ultrasound findings in correlation to the operative findings.

The accuracy of ultrasound regarding the enlargement of the median nerve as it enters the carpal tunnel that assisted and correlate with the operative finding (pseudoneuroma-median nerve swelling-proximal to the compression) was 87% accuracy with 88% Sensitivity, 85% Specificity with PV= 0.001.

The accuracy of ultrasound examination regarding the flattening of the Median nerve, especially at the level of the hamate bone to the operative finding (compression of the median nerve was observed under the ligament) was 76% accuracy with 76% Sensitivity, 100 % Specificity with PV= 0.017. The accuracy of ultrasound examination regarding (decreased mobility of the median nerve on flexion and extension of the fingers) to the operative finding (adherent tenosynovitis under surface of flexure retinaculum) was 71% accuracy with 38% Sensitivity, 100 % Specificity with PV= 0.005.

We considered and depend on the highest result, regarding accuracy, sensitivity , specificity and the lowest PV, the median nerve enlargement, which was frequently detected (41) times among the whole sample patients (65) and from the (52) operated patient (28) times recoded.

Conclusion

Ultrasound accuracy in diagnosis CTS is very significant, its sensitivity approaching that of NCS with accuracy reaching (87%). There is significant correlation between US findings in CTS and the operative findings. Ultrasound could be used confidently in symptomatic patient with CTS as fist line examination approach. Ultrasound is the only modality that can assess the fixation of median nerve in the carpal tunnel through dynamic technique. US of the median nerve in the carpal tunnel is relatively quick test that is extremely acceptable to the patient and can be performed in the outpatient clinic at initial assessment.

Recommendation

Ultrasound advocated as a screening tool in high-risk populations or symptomatic patient. High-resolution ultrasound systems with high frequencies probes (10-14 MHZ) is needed to gate more accurate diagnoses of CTS. Other ultrasound measurement and parameters such as vascularity of median nerve assess by Doppler study, newer technologies such as elastography and three-dimensional ultrasound prospectively will improve the diagnosis of CTS. Further studies with larger sample size, longer duration and follow up duration are highly suggested.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

References


3. El Miedany Y, Ashour S. Ultrasonography versus nerve conduction study in patients with carpal


Comparative Study of Hepcidin and Some Inflammatory Parameters in Pregnant Women at the Three Trimesters

Suha Abdul-Khaliq Al-Jowari

Department of Biology, College of Science, University of Baghdad, Baghdad, Iraq

Abstract

Comparative study of hepcidin and some inflammatory parameters (interleukin-2 and 6, tumor necrosis factor and c-reactive protein) from several Health Centers in Baghdad City was performed. Sixty adult apparently healthy pregnant women (twenty in each trimester) at different periods of gestation and twenty normal non-pregnant women (total eighty) were the subjects of this study. From each subject, 10 ml blood was collected in order to obtain serum. The supernatant of blood samples was used to quantify the serum TIBC level by spectrophotometric methods. Serum levels of hepcidin, iron (Fe), C-reactive protein (CRP), interleukin-2 (IL-2), interleukin-6 (IL-6) and tumor necrosis factor-α (TNF-α) were measured by standard methods using commercially available kits.

The results of the present study show that there was a significant (P<0.05) decrease in hepcidin concentration means at the three trimesters of pregnancy as compared with non-pregnant women. This study also demonstrate that there was a significant (p<0.05) increase in TIBC and transferrin concentrations at the second and third trimesters of pregnancy. On the other hand, these results explain a significant (p<0.05) decrease in iron concentration means at the first and second trimesters as compared with non-pregnant, while there was a significant (p<0.05) increase in IL-2 concentration means at the second and third trimesters of pregnancy. Further, the results of the present study demonstrate that there was a significant (P<0.05) increase in IL-6 concentration and C-reactive protein means at the three trimesters of pregnancy as compared with non-pregnant women. On the other hand, there was no significant difference in TNF-α at the three trimesters of pregnancy as compared with non-pregnant.

It is concluded from the present study that hepcidin and inflammatory markers were reduced as the pregnancy developed, while transferrin and TIBC concentrations were elevated in pregnant women at the three trimester as compared with non-pregnant.

Keywords: Hepcidin, Trimester, Interleukins, Pregnancy, C-Reactive Protein.

Introduction

Hepcidin, a peptide composed of 25 amino acids (Hep-25), is considered to be a regulatory molecule of systemic iron homeostasis [1, 2]. Hepcidin, is synthesized mainly in the liver by hepatocytes [3]. It regulates the metabolism of iron by the inhibition of iron absorption in the duodenum at the level of the intestinal epithelium [1, 3]. It is an antimicrobial small peptide and contributes to host defense by depriving microbes access to iron and through direct antimicrobial activity against microorganisms [4]. The role of hepcidin in the regulation of iron metabolism in pregnancy and its effects on the fetus and consequently on the newborn is not fully understood [1].

Cytokines are the intercellular messengers of the immune system and intimately participate in many aspects of pregnancy. IL6 is a multifunctional cytokine plays important roles in acute and chronic inflammation and autoimmunity [5, 6]. C-reactive protein found in the blood is considered as an acute-phase protein in which its level increase during inflammation, tissue damage, infection and neoplasia [7, 9]. Liver produce CRP in response to inflammatory cytokines such as IL-1, IL-6 & TNF-alpha [7, 9], which are responsible for inflammatory
response and maternal endothelial activation [7]. As rare and few studies concerning the level of hepcidin and these cytokines in pregnant women, this study was designed to compare the levels of hepcidin and some inflammatory marker in pregnant women at the three trimester of pregnancy.

**Materials and Method**

**Subjects**

This prospective, comparative study was performed at Baghdad City from the period between June 2018 to October 2018. Sixty adult apparently health pregnant women (twenty in each trimester) at different periods of gestation and twenty normal non-pregnant women (total eighty) were the subjects of this study. They were selected from several Health Centers in Baghdad City on the basis of their apparent health. All subjects were selected randomly during their antenatal visits [10]. Gestational age was estimated by the last menstrual period and confirmed or corrected by ultrasonography of the crown-rump length (dated in the first trimester) [1]. The age of the subjects ranged between 20 to 35 years. The normal non-pregnant women were chosen of the matching age group to act as controls. The informed consent was obtained from all subjects [10, 11]. Experimentally and control groups with history of diabetes, hypertension, hepatitis and any other acute or chronic illness were excluded from this study [8, 10].

**Blood sample collection**

From each subject 10 ml blood was collected from an antecubital vein with whole glass. In order to obtain serum, the blood was centrifuge at 2500×g at 4°C for 10 min and was stored in small portions at −25°C for subsequent biochemical analysis [1, 10, 11].

**Laboratory Analysis**

The supernatant of blood samples was used to quantify the serum TIBC level by spectrophotometric methods supplied by Biolabo Company, France (KURHADE et al., 1994; Talabani, 2015). Transferrin can be estimated indirectly from the TIBC value by the following equation:

\[
\text{Transferrin (g/dl)} = 0.7 \times \text{TIBC (g/dl)} \quad \text{(Talabani, 2015)}.
\]

Serum levels of hepcidin, iron (Fe) and C-reactive protein (CRP) were measured by standard methods using commercially available kits [1, 8].

Further, immunoassays of interleukin-2 (IL-2), interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α) using commercially available immunoassay kits.

**Statistical Analysis**

Analysis of variance test (ANOVA) was used to analyze the data obtained from the present study. The significance among means were found using Duncan’s test with assistance of SPSS program (version 21) at probability level p< 0.05 (Basher, 2003).

**Results and Discussion**

The results of the present study show that there was a significant (P<0.05) decrease in hepcidin concentration means at the three trimesters of pregnancy as compared with non-pregnant women. The hepcidin means were 93.287 ± 8.393, 74.859 ± 8.488, 55.457 ± 7.936 and 39.061 ± 6.543 ng/ml in non-pregnancy, first, second and third trimesters of pregnancy, respectively. (Figure 1).

![Figure 1: Hepcidin concentration means in non-pregnant and pregnant women at the three trimesters.](image)

This study demonstrate that there was a significant (p<0.05) increase in transferrin concentration at the second and third trimesters of pregnancy, while there was no significant difference in the first trimester as compared with non-pregnant women. The transferrin concentration means were 211.629 ± 4.803, 202.441 ± 3.702, 197.484 ± 3.908 and 193.586 ± 4.059 gm/dl in the third, second and first trimesters as well as non-pregnant women, respectively (Figure 2).
The results in Figure (3) illustrate that there was a significant (p<0.05) increase in the TIBC concentration means at the second and third trimesters of pregnancy, while there was no significant difference at the first trimester as compared with non-pregnant women. The TIBC concentration means were 276.623 ± 5.709, 282.120 ± 5.584, 289.201 ± 5.289 and 302.777 ± 6.331 gm/dl in non-pregnant, first, second and third trimesters, respectively (Figure 3).

On the other hand, the results in Figure (4) explain a significant (p<0.05) decrease in iron concentration means at the first and second trimesters, while there was no significant difference at third trimester as compared with non-pregnant. The iron concentration means were 59.833 ± 7.738, 49.618 ± 4.463, 52.269 ± 4.781 and 55.081 ± 4.808 g/dl in non-pregnant, first, second and third trimesters, respectively.

The results in Figure (5) illustrate that there was a significant (p<0.05) increase in IL-2 concentration means at the second and third trimesters of pregnancy, while there was no significant difference at the first trimester as compared with non-pregnant women. The IL-2 concentration means were 48.996 ± 5.021, 53.048 ± 4.313, 63.193 ± 3.982 and 80.217 ± 4.900 pg/ml in non-pregnant, first, second and third trimesters, respectively.

Further, the results of the present study demonstrate that there was a significant (P<0.05) increase in IL-6 concentration means at the three trimesters of pregnancy as compared with non-pregnant women. The IL-6 concentration means were 15.758 ± 4.309, 22.288 ± 5.163, 32.765 ± 5.274 and 44.228 ± 5.177 ng/ml in non-pregnant, first, second and third trimesters of pregnancy, respectively (Figure 6).
On the other hand, there was no significant difference in TNF-α at the three trimesters of pregnancy as compared with non-pregnant. The iron concentration means were 592.138 ± 54.880, 599.52 ± 53.797, 611.740 ± 52.257 and 628.133 ± 51.091 pg/ml in non-pregnant, first, second and third trimesters, respectively.

There was a significant (P<0.05) increase in CRP concentration means at the three trimesters of pregnancy as compared with non-pregnant women. The CRP means were 1.778 ± 0.283, 2.34 ± 0.378, 3.905 ± 0.555 and 6.527 ± 1.181 mg/L in non-pregnancy, first, second and third trimesters of pregnancy, respectively.

Hepcidin synthesis is reportedly stimulated by elevated plasma iron concentration, infection and/or inflammation, and is suppressed in conditions that demand increased serum iron, such as increased or ineffective erythropoiesis, hypoxia, anemia and also iron deficiency[2]. In pregnant women, it is lower than in non-pregnant healthy women and its level decreases as pregnancy progresses, with the lowest hepcidin levels observed in the third trimester[11; 12]. Increasing need for fetal iron and decreasing maternal iron levels in the third trimester were the probable reasons for the decrease in maternal hepcidin in the third trimester.

Hepcidin negatively regulates intestinal iron absorption, iron recycling by macrophages, iron release from hepatic stores and, during pregnancy, iron transfer in placenta. In turn, hepcidin secretion is regulated by iron stores, oxygenation, and inflammatory signals[2]. The signals that suppress maternal hepcidin during pregnancy are unknown. Pregnancy-specific regulators of hepcidin production may exist, or hepcidin may be suppressed in response to decreasing maternal iron levels during pregnancy.

Total iron binding capacity of the serum rise significantly during pregnancy, against the gradient of dilution, which is an expression of the vastly increased turnover of iron in late pregnancy. TIBC is influenced by subject’s iron and endocrine status and increases during pregnancy to the extent of 15% above non-pregnant level. The transferrin not bound to iron, is readily available resulting in increased TIBC.

C-reactive protein is in the range of gestational age-specific reference value[1]. However, it has been found that a positive correlation between the inflammatory marker C reactive protein (CRP) and serum hepcidin at time of delivery (gestational age 37–42 weeks). The C-reactive protein concentrations were slightly higher than in non-pregnant women.

Interleukin-2 concentrations were found to be lower in early pregnancy in those whose pregnancies continued compared with those that failed. Further, it was revealed a significant association between raised serum IL-2 and TNF-α and first trimester pregnancy loss, strengthen the relation between these agents and fetal rejection[6]. IL-2 concentrations have been found to rise towards the end of a normal pregnancy. This rise was attributed to a decrease in the concentrations of circulating immunosuppressive markers at this time.

**Conclusion**

It is concluded from the present study that hepcidin and inflammatory markers were reduced as the pregnancy developed, while transferrin and TIBC concentrations were elevated in pregnant women at the three trimester as compared with non-pregnant.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


Call for Papers / Article Submission

The editor invites scholarly articles that contribute to the development and understanding of all aspects of Public Health and all medical specialities. All manuscripts are double blind peer reviewed. If there is a requirement, medical statistician review statistical content. Invitation to submit paper: A general invitation is extended to authors to submit papers papers for publication in IJPHRD.

The following guidelines should be noted:
- The article must be submitted by e-mail only. Hard copy not needed. Send article as attachment in e-mail.
- The article should be accompanied by a declaration from all authors that it is an original work and has not been sent to any other journal for publication.
- As a policy matter, journal encourages articles regarding new concepts and new information.
- Article should have a Title
- Names of authors
- Your Affiliation (designations with college address)
- Abstract
- Key words
- Introduction or back ground
- Material and Methods
- Findings
- Conclusion
- Acknowledgements
- Interest of conflict
- References in Vancouver style.
- Please quote references in text by superscripting
- Word limit 2500-3000 words, MSWORD Format, single file

All articles should be sent to: editor.ijphrd@gmail.com
CALL FOR SUBSCRIPTIONS

About the Journal
Print-ISSN: 0976-0245  Electronic - ISSN: 0976-5506, Frequency:  Monthly

Indian Journal of Public Health Research & Development is a double blind peer reviewed international Journal. The frequency is half yearly. It deals with all aspects of Public Health including Community Medicine, Public Health, Epidemiology, Occupational Health, Environmental Hazards, Clinical Research, Public Health Laws and covers all medical specialities concerned with research and development for the masses. The journal strongly encourages reports of research carried out within Indian continent and south east Asia.

The journal has been assigned international standards (ISSN) serial number and is indexed with Index Copernicus (Poland). It is also brought to notice that the journal is being covered by many international databases.

<table>
<thead>
<tr>
<th>Journal Title</th>
<th>Print Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian Journal of Public Health Research &amp; Development</td>
<td>INR 9000</td>
</tr>
</tbody>
</table>

NOTE FOR SUBSCRIBERS

- Advance payment required by cheque/demand draft in the name of “Institute of Medico-Legal Publications” payable at New Delhi.
- Cancellation not allowed except for duplicate payment.
- Claim must be made within six months from issue date.
- A free copy can be forwarded on request.

Bank Details
Name of account: Institute of Medico-Legal Publications Pvt Ltd
Bank: HDFC Bank
Branch: Sector-50, Noida-201 301
Account number: 09307630000146
Type of Account: Current Account
MICR Code: 110240113
RTGS/NEFT/IFSC Code: HDFC0000728

Please quote reference number.

Send all payment to:
Institute of Medico-Legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall
Sector- 32, Noida - 201 301 (Uttar Pradesh)
Mob: 09971888542, 0120- 429 4015
E-mail: editor.ijphrd@gmail.com, Website: www.ijphrd.com